TRANSACTIONS

OF THE

ELEVENTH ANNUAL MEETING

OF THE

WESTERN

SURGICAL AND GYNECOLOGICAL

ASSOCIATION

HELD AT

Chicago, Ill., December 18 and 19, 1901

UNIV. OF CALIF.
MEDICAL SCHOOL

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EX-PRESIDENTS AND MEETING PLACES.

PRESIDENT.	PLACE.	YEAR.
S. S. Todd	Topeka	1891
Milo B. Ward (deceased)	Kansas City	1892
Milo B. Ward (deceased)	Des Moines	1893
Lewis Schooler	Omaha	1894
J. E. Summers, Jr	Kansas City	1895
T. J. Beattie	Topeka	1896
Joseph Eastman (deceased)	Denver	1897
D. S. Fairchild	Omaha	1898
H. C. Crowell	Des Moines	1899
O. Beverly Campbell	Minneapolis	1900
A. F. Jonas	Chicago	1901

The Western Surgical and Gynecological Association does not hold itself responsible for, or necessarily endorse, any of the papers printed herein.

George H. Simmons,
Secretary-Treasurer.

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TRANSACTIONS.

FIRST DAY—MORNING SESSION.

The Association met in Parlor L of the Great Northern Hotel, and was called to order at 9:30 A. M. by the chairman of the committee of arrangements, Dr. John B. Murphy, of Chicago.

Dr. Alexander Hugh Ferguson, of Chicago, delivered the following address of welcome on behalf of the local medical profession:

ADDRESS OF WELCOME BY DR. ALEX. HUGH FERGUSON.

MR. PRESIDENT AND MEMBERS OF THE WESTERN SURGICAL AND GYNECOLOGICAL ASSOCIATION: On behalf of the members of our Association, and, in fact, the whole medical profession of Chicago, it affords me great pleasure to extend to you a very cordial welcome. We feel honored by being permitted to entertain you as our guests and assure you that we will do everything in our power to render your visit to our metropolis as enjoyable and profitable as possible. We invoke in your favor that ancient but honorable custom which turned over the keys of the castle to the honored guest, so, in like manner, we turn over to you for your entertainment for the time being the great city of Chicago with all her emoluments and perquisites of officers. I want to impress upon you that though the cold, chilly winds of the North are upon us, that there is no winter in our hospitality and, in the language of a great philosopher, it "grows the more by the reaping." The very best that we have is at your disposal.

Some of you may think that you are not known to us, but, as a matter of fact, your distinguished labors

have preceded you to our libraries, laboratories and studies. You have each at some time or another, and on previous occasions like this you have conjointly added something tangible to our armamentarium that has comforted or relieved some poor sufferer. We appreciate you on this account, and also because of the individual characteristics which differentiate you as men from different states. We recognize that you have traveled long distances before you reached the borders of our Sucker State, and, after suffering various privations, you at last have arrived in this Windy City. But true to our name, environments and principles, we are delighted to take you in, and shelter you from the storm. With the wonderful resources, supplies, holdings and accomplishments of this city, the greatest railroad center in the world, the largest commercial center in the north and west, there is no excuse for not making you comfortable and happy. We invite you to our clinics, hospitals, laboratories, libraries, museums and societies. It is a refreshing pleasure to us all to see so large a number of the organizers of the Association present this morning, who are here to foster the institution they created.

The Western Surgical and Gynecological Association has responsibilities resting upon it of no mean order. Her labors represent the surgery and gynecology of the west, middle and northern states. In fact, similar societies in the south and east are watching our progress, behavior and productions, for they know that we are men of practical tendencies in our work, as well as straight to the point in expressing our observations and operative procedures. The time has now arrived for us to point out our indisputable claims to our superior professional status as teachers and operators as well as to our inventive genius. I look to America as the birthplace of future discoveries in medicine and I sincerely hope and believe that members of the Western Surgical and Gynecological Association will take an active part in this line of work.

We have reason to be proud of our Association for

what it has done, and we have faith in the hope that is within us. I think it is hardly necessary for me to say anything more in regard to the business which we are called upon to perform at this meeting; you all know what it is, and I feel that each of you is ready and eager to do his part. And, judging from this splendid presence of so many able representatives from all parts of the country, we may reasonably infer that it will be done in a manner satisfactory to everybody. Our Association is doing splendid work and we have a right to be elated at the record of the past, and I firmly believe that its future achievements will far exceed our fondest expectations. We are rapidly assuming a commanding position among kindred associations on the western hemisphere. Our proceedings and offerings, contributed by us and laid on the altar of medical science, are drawing the attention of the world. This shows that we are advancing, and is evidence that we are extending the boundary lines of medical knowledge into new fields. This is as it should be, for progress is the very life of our Association. Let us sincerely hope that our Society will ever keep in the vanguard of medical science in doing clean and effective work for the good of mankind, ever exploiting and investigating new fields and enriching our records with new and valuable matter, ever throwing new light upon the dark spots of variegated diseases, ever delving deeper into the secrets of Nature to ascertain the laws which hold in their grasp the life and death of all living things. Let us then gather inspiration from the noble character of our work and the high aim of our organization and the splendid destiny which awaits it.

"In this vast field there is no standing still;
We either gain the summit or descend the hill."

Gentlemen, again I welcome you. [Loud applause.]

RESPONSE BY DR. JOSEPH EASTMAN, OF INDIANAPOLIS.

MR. PRESIDENT AND MEMBERS OF THE WESTERN SURGICAL AND GYNECOLOGICAL ASSOCIATION: It gives me great pleasure, on behalf of this Association, to ac-

cept the kind invitation and cordial welcome that have been extended to us by Dr. Ferguson, and I wish to return our sincere thanks for the same. It is a pleasure to us to meet in the city of Chicago. This Association was born in an humble way; it has had many pleasant, agreeable and successful meetings in the cities of Denver, Omaha, Kansas City, Topeka and Des Moines.

It is with sadness I mention that the foster-father of this Association has passed to the unknown within the last year, since we met. I refer to Dr. Milo B. Ward, of Kansas City, Mo. I also think of other names, and among them the noble, great and kind-hearted Dr. Etheridge, who met with us at Des Moines. I recall his operative clinic before the Association that year.

They have a Southern Surgical and Gynecological Association; they have an American Association of Obstetricians and Gynecologists, and the American Gynecological Society. I believe the latter association has held one meeting west of the Ohio river in the twenty or more years of its existence. And so it seemed eminently proper that we should have a Western Surgical and Gynecological Association. [Applause.] The west has taken an active part in the great advances that have been made in medicine and surgery in this country. I thank Dr. Ferguson, on behalf of the members of the Association, for the generous welcome he has extended to us, because being so near Chicago I have many times been associated with or have had something to do with the physicians and surgeons of this city. I have been constantly in touch with many of the distinguished surgeons here, and from my standpoint I would name it the City of Brotherly Love rather than the City of Wind. I have never in my professional experience heard a Chicago physician or surgeon say an unkind or disrespectful word about a professional brother. [Applause.] This is more than I can say of other cities in America. We owe much to the city of Chicago for developing means and methods of abdom-

inal work. So it is a pleasure to think and to know that we have been so eloquently and warmly welcomed this morning.

This Association has done much good work, and it is destined to do much more. It is really in the full bloom and growth of its vigorous manhood, though it had an humble beginning. We gather here for the purpose of exchanging ideas, comparing experiences. We bring hither the tithes of our experience, that they shall be tested in the crucible of truth, and if among the dross there is found an atom of gold, we ask no letters patent for the same, but cast them on the common altar, for the common good of our fellow-beings, actuated as a society and as individuals, by the one grand, liberal and beneficent motive, lessening of burden and prolonging the span of human life.

The century which has so recently rolled on to the eternal past has placed in the magnificent temple of medicine many pillars of surpassing beauty and grandeur, while its surgical columns have risen high toward heaven, where, as gilded towers, they fain would vie with the God-given sunshine in dispelling the chill and gloom of human agony.

Chirurgia's tower, thy light's resplendent blaze
Dries woman's tears, and lengthens out her days;
McDowell and Sims, of our Columbia's clime
Began the work moved onward nigh sublime.
To woman, then, these blessings shall be given—
Queen of the home, and home the type of Heaven.

Here, where the western sun pours down his rays
And gilds the efforts of more recent days,
Mark that proud column, reared by our western men,
Among them, Murphy, Henrotin and Senn.

[Loud applause.]

The past rises before me like a vision. I see medical students flocking to Paris as the medical metropolis of the world. A little later I see them gathering around the Allgemeiner Krankenhaus, in Vienna, listening to the world-famed Billroth; later gathering in larger numbers in Berlin than in any other city. The vision of the past becomes the prophetic vision of the future, and I see the push, vigor, skill

and talent of American surgery claiming that it has rights, and America becoming the great center to which medical students will be invited, because the most celebrated teachers are on the American continent. When the time shall come the future metropolis of the world will be established, it will not be on the shores of the Atlantic, nor on the Pacific, but a more central location, and I fancy at that time it will be some place near Chicago, because here, in this great, enterprising city, with its large and high buildings, we have much to symbolize the great intellect and strong professional characters of the surgeons and gynecologists of the great West.

REPORT OF THE COMMITTEE OF ARRANGEMENTS.

Dr. Murphy, as chairman of the committee of arrangements, made verbal report.

There being no further business to come before the Association at this time, the reading of papers was begun.

Dr. J. Rudis-Jicinsky, of Cedar Rapids, Ia., read a paper entitled "An Old Shoulder Luxation, with Report of a Case; Illustrated," which was discussed by Dr. Schooler, and in closing by the essayist.

Dr. William Jepson, of Sioux City, Ia., read a paper entitled "Complete Dislocation of the Astragalus, with Presentation of a Case." Discussed by Drs. Freeman, Murphy, Ferguson, Kreider, and in closing by the essayist.

Dr. M. L. Harris, of Chicago, read a paper entitled "Some Internal Injuries of the Knee-Joint," which was discussed by Drs. Bernays, Halstead, Murphy, Schooler, and in closing by the essayist.

Dr. John B. Murphy, of Chicago, read a paper entitled "Arthroplasty for the Relief of Ankylosis without Destructive Bone Defects," which was discussed by Drs. Ferguson, Grant, Bernays, Freeman, and in closing by the essayist.

On motion, the Association adjourned until 1:30 P. M.

FIRST DAY—AFTERNOON SESSION.

The Association reassembled at 2 P. M., and was called to order by the president.

The president appointed as a committee on necrology to draft suitable resolutions on the death of Dr. Milo B. Ward, Drs. Schooler, Freeman and Eastman.

Dr. James E. Moore, of Minneapolis, Minn., read a paper entitled "Treatment of Dislocation of Clavicle Through an Open Wound, with Report of a Case." This paper was discussed by Drs. Henry, Halley, Dunsmoor, Fairchild, Hamilton, and the discussion closed by the essayist.

Dr. Campbell moved that the visiting gynecologists and surgeons be extended the privileges of the floor in discussing the different papers to be read. Carried.

Dr. George Halley, of Kansas City, Mo., read a paper entitled "Etiological Factors in the Production of Tumors."

Dr. Joseph Eastman, of Indianapolis, followed with a contribution entitled "A Consideration of the Different Surgical Procedures in the Removal of Fibromyoma of the Uterus."

Dr. O. Beverly Campbell, of Chicago, read a paper on "Myomectomy: Its Place in the Treatment of Fibromyoma of the Uterus."

Dr. Miles F. Porter, of Fort Wayne, Ind., contributed a paper entitled "Management of Fibromyoma of the Uterus, Complicated with Pregnancy."

Dr. Franklin H. Martin, of Chicago, contributed a paper on "The Present Status of the Electrical Treatment of Fibromyoma of the Uterus," which, in the absence of the author, was read by Dr. Campbell.

The discussion of this symposium was opened by

Dr. Henry, and continued by Drs. Knott, Davis, Moore, Mayo, Bernays, Wallace, Warren, Tichenor, Macrae, Schooler, and the discussion closed by the various essayists.

Dr. Edward Hornibrook, of Cherokee, Ia., read a paper entitled "Two Cases of Cysts of the Broad Ligament Complicated with Myxoma."

Dr. D. S. Fairchild, of Clinton, Ia., read a paper on "Diffuse Sarcoma of the Uterus."

These two papers were discussed jointly by Dr. Halley.

On motion, the Association adjourned until 7 P. M.

FIRST DAY—EVENING SESSION.

The Association reassembled at 7 P. M., and was called to order by the first vice-president, Dr. A. W. Abbott, of Minneapolis, Minn.

The first thing in order was the address of the president, which was delivered by Dr. A. F. Jonas, of Omaha, Neb. He selected for his subject, "The Use of the Gall Bladder as a Suspensory Ligament for Prolapsed Liver." It was the president's wish that his address be discussed. The discussion was opened by Dr. Niles, and continued by Drs. Eastman, Reed, Bernays, Dunsmoor, Porter, Freeman, and the discussion closed by President Jonas.

Dr. B. Merrill Ricketts, of Cincinnati, O., made some remarks on "Heart Suture," which were discussed by Drs. Jepson, Reed, Halley, and the discussion closed by the essayist.

Dr. W. W. Grant, of Denver, Colo., read a paper on "A Simple Method of Extension in Fracture of the Metacarpal Bones, and Oblique Fracture, Simple or Compound, of the Forearm."

On motion, the Association then adjourned until Thursday, 9:30 o'clock.

SECOND DAY—MORNING SESSION.

The Association met at 9:30 A. M., with the president in the chair.

Dr. John P. Lord, of Omaha, Neb., read a paper entitled "Some Observations Made in Europe."

The next thing in order was a symposium on prostatectomy.

(*a.*) "A General Review of the Subject, with Special Reference to Total Extirpation of the Gland Through a Median Incision in the Perineum," by Dr. Alexander Hugh Ferguson, of Chicago.

(*b.*) "Symptoms, Signs, Diagnosis, Prognosis and Palliative Treatment: (*a*) Massage; (*b*) Aspiration; (*c*) Catheterization; (*d*) Dilatation, and (*e*) Cystotomy," by Dr. Lewis Schooler, of Des Moines, Iowa.

(*c.*) "The Etiology and Pathology of Prostatic Hypertrophy and Suprapubic Drainage as a Method of Treatment," by Dr. A. C. Bernays, of St. Louis, Mo.

(*d.*) "Suprapubic Prostatectomy," by Dr. C. H. Mayo, of Rochester, Minn.

(*e.*) "The Indications and Limitations of the Bottini Operation," by Dr. Louis E. Schmidt, of Chicago.

The joint discussion on this symposium was opened by Dr. Andrews, and continued by Drs. Murphy, Freeman, Grant, Eisendrath, Halley, Hamilton, Bevan, Dunsmoor, Lydston, and the discussion closed by the various essayists.

The executive council recommended the following officers for the ensuing year: President, Dr. James E. Moore, Minneapolis, Minn.; first vice-president, Dr. J. R. Hollowbush, Rock Island, Ill.; second vice-president, Dr. W. W. Grant, Denver, Colo.; secretary-treasurer, Dr. George H. Simmons, Chicago, Ill.; executive council, Dr. C. H. Mayo, Rochester, Minn.,

and Dr. Alexander Hugh Ferguson, Chicago, Ill. Time and place of next meeting, December 29 and 30, 1902, St. Joseph, Mo. On motion, the report of the executive council was adopted.

On motion, the Association adjourned until 1:30 P. M.

SECOND DAY—AFTERNOON SESSION.

The Association reassembled at 1:30 P. M., and was called to order by the president.

Dr. B. B. Davis, of Omaha, Neb., read a paper on "A New Method of Anchoring Movable Kidney," which was discussed by Drs. Byford, Harris, and in closing by the essayist.

Dr. E. Wyllys Andrews, of Chicago, read a paper entitled "A New Operation for Wandering Kidney," which was discussed by Drs. Ferguson, Reed, Hamilton, Davis, and the discussion closed by the essayist.

Dr. A. E. Halstead, of Chicago, read a paper entitled "Intestinal Obstruction from Meckel's Diverticulum, with Report of a Case," which was discussed by Drs. Bernays, Macrae, and in closing by the essayist.

Dr. R. Harvey Reed, of Rock Springs, Wyo., read a paper entitled "Grave Abdominal Injuries Without External Evidences of Traumatism."

Dr. A. W. Abbott, of Minneapolis, Minn., followed with a paper on "The Immediate Effect of Intestinal Exposure."

These two papers were discussed by Drs. Jepson, Wetherill, Nelson, and the discussion was closed by the essayists.

Dr. W. O. Henry, of Omaha, Neb., read a paper entitled "How Shall we Treat Sepsis Following Labor and Abortion?" Discussed by Drs. Eastman,

Wetherill, Nelson, Macrae, Warren, Davis, and the discussion closed by the essayist.

Dr. H. D. Niles, of Salt Lake City, Utah, read a paper on "Our Hospitals." Discussed by Drs. Nelson and Davis.

Dr. Van Buren Knott, of Sioux City, Ia., read a paper on "Spina Bifida," which was discussed by Drs. Lord, Freeman, Nelson, Mayo, Halstead, and the discussion closed by the essayist.

Owing to the lateness of the hour, a paper by Dr. G. G. Cottam, of Rock Rapids, Ia., entitled "The Operative Relief of Impaired Function of the Elbow Joint Due to Epiphyseal Displacement," was read by title.

Dr. W. W. Grant offered the following resolution: "Resolved, That a vote of thanks be tendered to the Chicago members of this Association for their kind treatment and generous hospitality extended to the visiting members." On motion, the resolution was adopted.

NEW MEMBERS.

The following were elected members of the Association:

E. Wyllys Andrews, Chicago, Ill.; Henry T. Byford, Chicago, Ill.; Charles C. Carter, Rock Island, Ill.; E. C. Dudley, Chicago, Ill.; George L. Eyster, Rock Island, Ill.; Daniel N. Eisendrath, Chicago, Ill.; H. S. Forgrave, St. Joseph, Mo.; Leonard Freeman, Denver. Colo.; Wm. E. Ground, West Superior, Wis.; Jacob Geiger, St. Joseph, Mo.; A. E. Halstead, Chicago, Ill.; Geo. N. Kreider, Springfield, Ill.; Donald Macrae, Jr., Council Bluffs, Ia.; Franklin H. Martin, Chicago, Ill.; Charles W. Oviatt, Oshkosh, Wis.; F. A. Patterson, St. Joseph, Mo.; Miles F. Porter, Ft. Wayne, Ind.; B. Merrill Ricketts, Cincinnati, O.; W. E. Schroeder, Chicago, Ill.; Louis E. Schmidt, Chicago, Ill.; C. A.

Stewart, Duluth, Minn.; William A. Tichenor, Chicago, Ill.; Raymond C. Turck, Chicago, Ill.; C. H. Wallace, St. Joseph, Mo.

On motion, the Association adjourned, to meet in St. Joseph, Mo., December 29 and 30, 1902.

GEORGE H. SIMMONS, Secretary-Treasurer.

PAPERS AND DISCUSSIONS.

THE USE OF THE GALL-BLADDER TO RESTORE A PROLAPSED LIVER.

By A. F. JONAS, M. D.,
OMAHA, NEB.

We meet again to-day, as we have often before, to relate our experiences, to detail our observations, to reiterate or modify our former views or opinions. We meet for our advancement and for human weal.

It is with the greatest pleasure that I greet you at this annual convention. As your presiding officer, I am profoundly grateful and I deeply appreciate this mark of your esteem in having honored me with the highest office which it is possible to bestow on any member of this association. I am deeply sensible of the fact that I can never, even in a small way, merit your confidence. It shall be my aim, however, to devote my humble efforts in the years to come to a contribution of my mite toward the upbuilding and uplifting of this organization—an association which, although of humble beginning and modest ambitions, yet with high aims and earnest effort, has grown to occupy an honorable place beside the great associations of this country.

Our country is so vast that we must, of necessity, have medical and surgical associations whose membership is drawn from well-defined sections. It is not possible that the great army of special workers can convene at one and the same annual convention. It be-

came evident, as our knowledge increased along special lines and as the special fields constantly became broader, that special societies, more or less sectional in character, became a necessity. Out of associations covering the entire field of medicine and surgery came the organizations whose membership was composed of men who devoted their labors and study to limited fields. The Western Surgical and Gynecological Association is one of these. While no man is excluded from beyond a certain boundary, it is the intention to bring together the active working surgeons of the great west and northwest, a section that has no exact boundaries and yet is sufficiently well defined that its area is well understood. To the efforts chiefly of the late Dr. Milo B. Ward, of Kansas City, do we owe the existence of this association. Through the energetic labors of this untiring, progressive, scientific and skillful surgeon, it came into existence. His untimely death has deprived us of a splendid observer, a voluminous contributor, a wise counselor and a true friend. We will, for many years to come, miss him from our deliberations. We will cherish for him the tenderest recollection and endeavor to emulate his example.

It is with great pleasure I congratulate you on the growth of our association, on the increasing enthusiasm of our fellows, on the splendid scientific work that has been achieved and on the practical results derived from these annual conventions. The devotion to scientific labors has been absolute. Petty politics and personal jealousies have found no place in our deliberations. The unswerving aim has been diligent research, patient investigation and a following of truth wherever it may have led.

It is not my purpose to-day to indulge in a eulogy regarding the development of this association, nor to review the literature pertaining to the changes and

growth along surgical lines, but I have chosen a topic for discussion that I hope may be profitable.

Conditions concerning a descent or displacement of the abdominal organs have all too often escaped notice and are not sufficiently considered in the management and treatment of the disturbed secretory and digestive functions. That every organ should occupy its normal location to perform its proper function, is self-evident; and that any deviation from the normal position is at the expense of its real office, is easily understood. Our attention to-day will be directed to one organ, the liver. That this organ is sometimes displaced downward to a considerable degree will be shown by the two following cases. That there is usually modified function and a well-defined clinical picture belonging to this change of position will be also shown.

Case I.—Entered St. Joseph Hospital June, 1896. Mrs. S., aged 41, housewife. Had since three years suffered from paroxysms of severe pain located in the right hepatic region. These pains, always sudden in onset, sometimes subsided in the course of one or two hours, but occasionally continued until relieved by opiates. Whether they were relieved spontaneously or by anodynes, they were always succeeded by nausea and an aversion for food lasting from two days to a week. During the intervals she had a dragging pain in the right hypochondriac region. A year previously she had had a moderate degree of jaundice. Otherwise her history was negative.

Status præsens.—On examination was found a woman apparently older than her real age, fairly well nourished. Her abdomen was distended, tympanitic; the abdominal walls were pendulous, soft and flabby and covered with numerous striæ, the result of childbearing. On palpation, pain on pressure was elicited over the region of the gall-bladder, but no enlargement of

that viscus could be made out. A movable lump was found between the right costal arch and the iliac crest, which proved to be the right kidney. The diagnosis was biliary calculi in the gall-bladder and movable right kidney. Cholecystotomy and nephrorrhaphy were recommended and agreed to by the patient.

Operation.—After the usual preliminary preparations, a vertical incision was made beginning at a point over the median end of the ninth rib and extending downward four inches. On entering the abdominal cavity the lower margin of the liver was three finger-breadths below the costal arch. The liver could very easily be elevated to its normal position, but it descended very slowly when pressure upwards was released. In appearance it was normal. The gall-bladder was easily found and several calculi could be felt through its walls. The displaced and movable kidney could be made out. The liver could be held in place by little effort, particularly when an ordinary amount of traction was made on the gall-bladder, so the question presented itself, why not use the gall-bladder as a suspensory ligament? Accordingly it was sutured in the uppermost part of the wound, snugly against the costal arch, the sutures passing through the gall-bladder wall, the parietal peritoneum and muscles. Before closing the peritoneal cavity, an exploration was made for the movable kidney, but it had receded to its normal position and could not be displaced. The peritoneum was then closed, the remaining wound sutured in the usual way, save to allow for opening the bladder. This was done and seven calculi removed. A long drainage tube was introduced and the wound was then dressed by an antiseptic hygroscopic pad. The drainage tube was removed in one week. The wound closed at the end of four weeks. The patient was directed to wear a snugly-fitting abdominal band. Subsequently several

examinations were made. On percussion the liver had remained in its normal position and the dragging pain had disappeared. No displacement of the kidney could be made out although she assumed several positions, straining in various ways. It was evident that the descended kidney was dependent on the descent of the liver. Unfortunately in this case it was not ascertained whether there was associated a downward displacement of the stomach and colon.

The foregoing experience has been the means of a more thorough examination, particularly as to the position of the liver and other abdominal viscera, in all our cases of affections involving the gall-tracts. It is a fault to which we must all plead guilty more or less, that of ascribing all symptoms in a given case to the chief pathological factor and overlooking other deviations from the normal, equally as important and often contributing a large share to the symptomatology. Prolapsed abdominal viscera are frequently observed and their rectification in only a few instances has been solved. Occasionally one organ may have descended, often more than one, as in the foregoing case. And such a state of affairs is further illustrated in the following instance.

Case II.—M. A., aged 65, farmer, gave the following history: He had always been well, except for the diseases incident to childhood and an old right femoral hernia, until three years ago, when he had a sudden attack of severe pain in the right hypochondriac region, which was designated gall-stone colic and which subsided in an hour after the hypodermic administration of morphine. There was no jaundice with that attack. The pain has recurred at irregular intervals to the present time. It always occurred in the same locality and often was most excruciating, being invariably associated with more or less tenderness on pressure along

the border of the right costal arch. Nausea and vomiting were often present during and after an attack. During the last year he began to experience a dragging feeling in the right hepatic region during the periods of intermission. His hernia had become irreducible and exceedingly painful, which was the cause of his seeking the hospital. He was admitted to the M. E. Hospital, January, 1899, and we found the following conditions:

Status præsens.—He was sparely built, of medium height, and appeared much older than his actual age. He appeared intensely jaundiced; his pulse was 80, temperature, 99°; his abdomen was distended; he had a right interstitial femoral hernia; a sensitive, rounded, hen-egg-sized swelling could be felt about four inches below the costal arch. On percussion the hepatic dullness began at the lower margin of the seventh rib and extended downward fully three inches below the costal margin. On palpation the lower margin of the liver could be felt at the lower boundary of dullness. The stomach was then distended with air through a stomach tube. Its lower curvature reached to the umbilicus, but it did not seem dilated. The diagnosis was irreducible, interstitial, femoral hernia, biliary calculi in the gall-bladder and common duct, with a prolapsed liver. An immediate operation for the hernia, and subsequent surgical interference for the cure of the biliary obstruction, was readily consented to on the part of the patient.

Operation.—On account of his enfeebled condition it was considered inadvisable to do more than to immediately relieve the incarcerated hernia. The hernial tumor had increased in size until, in its upward and outward direction, it reached to the anterior iliac spine. Toward its median direction it extended to the pubic spine. Through a long oblique incision the

hernial sac was easily enucleated and its contents were readily reduced after the hernial opening had been enlarged. The neck of the sac was transfixed with catgut and the sac was cut away. The margins of the hernial opening were approximated with silver sutures and the skin with subcuticular silkworm-gut. The healing process was uneventful. Two weeks later the second operation was undertaken. On opening the abdomen by a vertical incision, the liver was seen to extend about three inches below the costal margin. The distended gall-bladder appeared below the hepatic border. The liver was very easily pushed upward to its normal position. The right index finger was introduced into the foramen of Winslow. A calculus was found to be lodged in the common bile duct. This calculus, in its duct, was raised forward, was easily laid bare, and, after the introduction of four sutures in the duct wall, it was removed through a longitudinal incision. The wound was then closed by tying the previously applied sutures. The gall-bladder was then fastened in the uppermost part of the wound, snugly against the costal arch. After placing a rubber drain, with one end reaching to the common duct over the line of sutures, the other end projecting from the lower end of the abdominal wound, the peritoneum was closed, allowing the gall-bladder fundus to project at its point of attachment. The gall-bladder was opened and four calculi were removed. A rubber drain was placed in the bladder and the abdominal parietes were approximated between the two drains. The healing process was uneventful, the lower drain being removed in five days, the upper one in ten days. The liver had retained its normal location, as was indicated by the normally located area of dullness. The stomach was apparently in its normal location, as was shown by air-inflation through a tube. He was discharged, wear-

ing a snugly fitting abdominal band. The liver has remained in its normal position, as has been ascertained by a recent examination and by the disappearance of all discomfort.

As we review the foregoing cases, several propositions present themselves for consideration. First, what is the cause of hepatoptosis? Second, does the liver descend alone or are other abdominal organs involved? Third, is the gall-bladder, as utilized in the preceding cases, an efficient support? In this connection we will exclude such displacements as are brought about by neoplasms, or by conditions that augment the size of the organ permanently. It is intended that our discussions will be limited to displacements where the liver itself is free from histological changes and where its modified function is dependent on the descent of the organ.

Let us at the outset have a clear understanding of the normal supports of the organ. "We find that the normal position of the liver is dependent chiefly on its intimate connection with the vena cava inferior. This great vessel, passing upward to the heart, is closely adherent to the back wall of the abdomen, is deeply lodged for some inches of its upper portion in the substance of the liver and receives from this viscus the few great and many small hepatic veins. The support afforded by the underlying hollow viscera—the stomach and bowels—is not to be ignored. Usually these are occupied to a considerable extent by gas and thus act as a sort of air cushion upon which their bulky associate can repose. The fibrous cord, which results from atrophy of the umbilical vein of intra-uterine life and is known as the round ligament of the liver, does its share in holding up the organ. Its upper part is firmly fastened in the umbilical fissure, from the front end of which it passes down, close to the anterior abdominal

wall, enclosed in the free end of the falciform ligament and terminates at the navel, with the cicatricial tissue of which its free end is fused. Finally, there are four ligaments formed by folds of peritoneum. The superior, formed by the serous tunic; the suspensory, because the liver seems to hang from it; the broad and the falciform."—Gerrish.

"The force by which the liver is retained within the arching dome of the diaphragm is a considerable one. Luschka compares the intimate contact of the two curved arches of the diaphragm and liver to a great ball and socket joint, held together by atmospheric pressure. The path that the liver must describe when it descends from its normal position is the same it took when it rose from its fetal situation. In its descent the liver goes through a peculiar axis rotation. The direction of this rotation is toward the anterior and inner portion of the abdomen. The duodenum, pylorus and hepatic flexure of the colon will, of necessity, for anatomical reasons, have to descend with it. The posterior lower edge of the liver rises during this axial rotation and becomes superimposed on the upper end of the kidney; if there has been a predisposition to abnormal motility or loose attachment of the kidney, it will become completely dislocated."—Hemmeter, Diseases of the Stomach, p. 705. The abdominal muscles are important factors in maintaining the normal position of the liver as well as the other abdominal contents.

It is clear that we must consider these several factors: First, the intimate contact of the two arched surfaces between the liver and diaphragm; second, the suspensory ligaments; third, the intimate relations between the vena cava inferior and the liver; fourth, the hollow viscera; fifth, the abdominal walls.

The suspensory ligaments of the liver are not

adequate in themselves to support the organ. Nor can the hollow viscera be depended upon; nor the attraction between the well-fitting surfaces of the liver and diaphragm; nor the round ligament; nor the attachment to the vena cava; nor the abdominal walls. It is evident that each one and all of these supports are necessary. Any defect in one or more of them invites a displacement. Should, for example, the abdominal walls lose their tonicity by prolonged overdistention due to constipation, or by repeated pregnancies, the abdominal viscera must of necessity become displaced, gradually involving, to a greater or lesser degree, the entire abdominal contents, followed eventually by an elongation of the hepatic ligaments.

According to Glenard, the hepatic flexure of the colon descends, followed by a displacement of the transverse colon, to a point where it is connected with the pyloric end of the stomach by the gastro-colic ligament; the colon becomes kinked and fecal stagnation results. When the colon has descended the remaining viscera follow. The stomach, liver and kidneys descend in their turn. Accordingly, we have a secondary hepatic displacement, dependent primarily on a descent of the hollow viscera.

A primary displacement of the liver may be brought about, first, by a trauma, forcibly displacing the organ downwards and injuring its ligamentous supports; second, by a prolonged increase in weight of the liver, due to venous or biliary obstruction.

Confining our observations to the cases herein detailed, we found several conditions common to both. The abdominal walls were relaxed. There was more or less gaseous distention. The bowels were more or less constipated. All these conditions favor enteroptosis. While in our first case we failed to establish displacements aside from the liver and kidney, simply

because of lack of sufficient examination, yet gastro- and enteroptosis must have been present, because it is inconceivable that a liver could be so prolapsed as that was without crowding down organs located beneath it. In our second case we established the existence of prolapsed stomach and intestines. In our second case there existed a biliary obstruction due to the location of a calculus in the common duct, producing almost complete biliary obstruction. As a consequence the weight of the liver was increased, a condition which, no doubt, contributed to its descent.

Now the query arises, did the biliary calculi play a role as an etiological factor in the prolapsus, or did they play only an incidental part? Did the prolapsus cause the formation of the calculi? These are questions that are not included in the scope of this paper and do not concern us at this time. Confining ourselves to our main propositions, our last one can be briefly answered. In both our cases the liver has remained in its normal position, as has been ascertained by recent examinations. The area of liver dullness has remained normal, the dragging sensation in the right side, complained of by both patients, has disappeared.

The use of the gall-bladder to suspend the descended liver appears practical. But to make it effective the abdominal walls should be assisted for a considerable time by an abdominal band. If the relaxed abdominal walls are not assisted to overcome the enteroptosis, the gall-bladder attachment would, no doubt, become elongated or entirely detached, favoring recurrence. In attaching the gall-bladder as we did, we simply lifted the outer edge of the liver upward and outward so as to overcome the rotation downward and inward.

In conclusion, we may say—

First—The cause of hepatoptosis consists in a modi-

fication of one or more of its normal supports, or an increase of the size and weight of the liver.

Second—It is impossible for the liver to descend without producing a descent of the hollow abdominal viscera.

Third—The utilization of the gall-bladder as a suspensory ligament, to maintain and hold in its normal position a prolapsed liver, together with certain other abdominal organs, seems practical.

DISCUSSION.

DR. H. D. NILES, of Salt Lake City, Utah: Mr. President—Dr. Jonas, in his most excellent address, gave us a very unique and ingenious explanation of the chain of abdominal symptoms that have puzzled all of us at times. In his cases he presented two pathological factors: One, inflammation of the gall-bladder and gall-ducts, as indicated by the presence of stone, and the other, displacement of the liver; and that in the abdominal viscera has been produced different conceptions of pathology, whether it is the mechanical displacement of the kidney, the uterus, or the bowels that produced the symptoms or the inflammatory lesions upon which they depend. I have learned to regard these displacements with each year's experience more and more as dependent upon inflammatory troubles, and less and less upon the particular position of the viscera. The support of the displaced uterus with a pessary or by operative measures has seemed to me with each year's experience less necessary; and it has been so in the fixation of the kidney. All of the abdominal viscera seem to require for the healthful performance of their functions a certain amount of mobility. Fixation has oftentimes been productive of as much harm as an excessive amount of mobility. A comparison is easy to make between an inflammation of the gall-bladder and gall-ducts, and an inflammation of the Fallopian tube and the appendix. So far, I believe, we have never yet found an enterolith in the Fallopian tube, but we have in the appendix, and I believe that in the gall-bladder and gall-ducts the stones will be found to be of microbic origin and to depend upon an inflammatory lesion. A few years' experience in operations on the upper right quadrant of the abdomen has led me to believe that in a very large majority of cases distress in that region is due to inflammatory lesions in the bile-ducts or gall-bladder, not quite, but nearly as often as about the appendix, producing not as serious, but still serious, symptoms, sufficient to demand operative measures with or without the presence of gall-stones, in many cases finding adhesions to the duodenum and colon sufficient to produce urgent symptoms. So, at the present time, while I feel that the ideas set forth in the paper deserve our earnest study and we ought not to conclude too

hastily, still I should feel more like regarding those troubles as due to inflammatory lesions involving the gall-bladder and gall-ducts.

DR. JOSEPH EASTMAN, of Indianapolis, Ind.: I was very much interested in the paper of Dr. Jonas, as it opened up a field for a good deal of thought. I had already believed that displacement of the liver was due to its increased weight from obstruction of the gall-duct. One thing has made me believe that. Some years ago I was asked to see a woman who was supposed to have an enormous ovarian cyst which was ascitic. Finding that she had a good heart and good kidneys upon which to base a diagnosis, I decided to make an exploratory abdominal section in the region of the liver, which I did. I found no gall-stones, but found the liver three times as large as it should have been, the enlargement probably having been due to malaria. Having seen quarts of gall pour out through the tube in cholecystotomy many times, I utilized the drainage which I had seen many times before, hence fixed the gall-bladder in the wound as described by Dr. Jonas. Many quarts of gall poured out through that tube during the three or four weeks she was in the hospital, at the end of which time the liver was almost of normal size, and has remained so ever since, so far as I can discover. I should say, that in 75 per cent. of the cases upon whom I have operated for gall-stones the liver has been markedly enlarged, and I attributed that to the increased weight, but it may be due to other causes.

With reference to the gall-bladder acting as a suspensory ligament, I believe it will do that for a time; but someone, I cannot recall the name just now, in Germany, made a series of post-mortem examinations on patients who had undergone cholecystotomy, and found that the gall-bladder had shrunken to a mere fiber. In one instance it was broken. At one post-mortem which I saw, after some years had elapsed, the gall-bladder was not larger than a shoe-string; whether it was due to tension on the liver, I do not know, but there was shrinkage, and the gall-bladder was not larger than a shoe-string, completely shrunken, and practically destroyed.

DR. R. HARVEY REED, of Rock Springs, Wyo.: We are indebted to Dr. Jonas for this practical paper, and for some new ideas, so far as I am concerned, in reference to methods of treatment of this form of disease. In operating for floating or misplaced kidney, I have frequently noticed the liver was down very much below its normal position, and have laid the displacement of the kidney in many instances to the liver. In these same conditions I have found there was no enlargement of the gall-bladder. I recall two cases in which no gall-bladder was to be found. I remember very well seeing Dr. Keen operate on a case at the Presbyterian Hospital in this city some years ago in which he expected to remove gall-stones, but very much to his disappointment he did not find a gall-bladder at all. I operated on a case last year in which I was in the same fix. I was positively certain I had obstruction from gall-stones, but when I operated there was not the slightest sign of a gall-bladder; yet the liver descended so far as to give trouble with the kidney. In this

case in particular, which I operated on last, it was evident that there are other causes which produce displacement of the liver, aside from those in which we have disease of the gall-bladder itself, and the essayist has clearly set that forth in his paper. The question has arisen in my mind, and perhaps Dr. Jonas can answer it, as to whether there is not some danger of trouble with the hollow viscera when the liver is suspended in the manner he has described. We can readily understand that by making suspension in this way we might have trouble with the hollow viscera hanging down over the suspension that he makes artificially. It is possible we might not have any trouble at all, but that is one thing we should guard against at least.

The paper is a very valuable one; it is worthy of our closest attention, and I would suggest following up the lesson he has taught us here in practical work.

DR. A. C. BERNAYS, of St. Louis, Mo.: I enjoyed the paper of Dr. Jonas very much, and I rise simply to relate an experience I had with hepatoptosis. Dr. W. C. Rogers, of Springfield, Mo., brought a young woman to me whom he thought had an abdominal tumor. I made a most careful examination, and diagnosticated a large solid myoma of the uterus. I made an incision from the umbilicus to the symphysis pubis, and I found that she had no tumor whatever, but that her liver was in the lower part of the abdomen and in the pelvis. This case occurred ten years ago. I told the doctor who was standing by, that I had never seen anything like that, and that the only explanation I could offer was that the liver had never ascended, but was in the position in which it was between the eighth and tenth months of gestation. That girl, who recovered from the exploratory laparotomy, was shot by her lover and killed about two years afterwards. The doctor wrote me the results of the post-mortem examination; he was coroner's physician of the county at the time. He wrote me to this effect: "Dear Doctor—I am very glad to be able to tell you that your diagnosis at the time of the operation was correct, for the very important reason that after the girl left St. Louis she was taken to other surgeons in Kansas City, and they insisted that she had a fibroid tumor, and that the liver could not be down there (the pelvis); but through the misfortune of her having been shot, I was enabled to make a post-mortem examination, and I found the liver was in the pelvis, as was found at the time of the operation, and as I saw it." The Kansas City surgeons thought I had mistaken the liver for a tumor after opening her abdomen. I do not see how they could think of such a thing, and I told the people so.

In connection with the paper of Dr. Jonas, this case has a bearing, namely, I do not believe it is always possible to diagnose whether or not the liver, which is lower than it should be, has ever been higher than it is when we are examining it. I do not know but what many of the low livers which reach below their margins were never higher at any time of the patients' lives. That is the point I want to bring out. I do not see how we can demonstrate that the livers have ever been higher than they are when found at the operation.

DR. F. A. DUNSMOOR, of Minneapolis, Minn.: To bear out

what Dr. Bernays has said, a case came under my observation of a man, who fell and sustained an injury to both legs. The injury was accompanied by severe shock. He was brought to me, and on examination I found his liver was below the level of the umbilicus on the right side, and resting in the antrum of the ilium. It was about three times its normal size. I could not make it occupy its normal position, and I could readily see two or three reasons for that, and among them, the liver was too large to go into its ball and socket joint again, and the other was, I supposed other organs had occupied its position. There was tympany through the part and resonance, such as would be elicited by percussing over a lung. This is one of the cases which Dr. Jonas' operation would fail to remedy.

DR. MILES F. PORTER, of Fort Wayne, Ind.: I would like to ask the essayist whether he examined as to the breadth of liver dullness in those cases, how high up it extended, whether there was increased dullness in an upward or downward direction, and I would like to have him answer now if he will.

DR. JONAS: In percussing the liver I took not only the vertical diameter, but the antero-posterior diameter was considered in the cases in which I succeeded in making a diagnosis. I intended to speak of the difficulties attending the diagnosis in locating the liver exactly.

DR. PORTER (resuming): I do not believe suspension of the gall-bladder will hold a four-pound liver if it is prolapsed, because the axial rotation, of which the Doctor spoke, will, in my judgment, not hold it. I want to say, too, with reference to the remarks made by Dr. Niles, I believe the symptoms are not the result of a displaced organ or organs so much as they are the result of inflamed organs. The majority of cases of biliary colic are the result primarily of gall-stones, but the patient does not have colic until he gets a cholecystitis or a cholangitis, as a rule. The relief of the patients, I believe, to have been due largely, not to the suspension of the liver by sewing the gall-bladder fast, but to the fact that the gall-bladder was drained and the cholecystitis cured.

We all know that women have displaced livers more often than men; also displaced kidneys, and they are usually on the right side. Displaced kidneys are sometimes the result of displaced livers, but I have never known anyone to take advantage of this fact in fixing the kidneys. It seems to me, to attempt to put a kidney where it belongs, high up, with a four-pound liver pounding on it, is not good judgment. The liver still remains and is going to hammer on the kidney. Why not fix the kidney a little lower down to prevent this hammering on it by the liver? Then, the liver will not hammer the kidney loose. I believe it is a practical point in the fixation of a right-sided displacement of the kidney.

DR. JONAS (closing the discussion): The subject was treated in an incomplete manner for one special reason. There were two cases which I did not report, because they were so recent that I did not feel warranted in including them in this paper. One of our faults is the premature publication of cases. Medical literature is filled with reports of worthless cases because they were reported too soon. The two which

I did not report were cases in which there was no obstruction of the biliary tract, or no symptoms pointing in that direction. In both of these patients prolapse was made out readily through thin abdominal walls. In thin subjects we can more readily make a diagnosis of a displaced liver than in those who have thick abdominal walls. In a person of great size it would be absolutely impossible, at least extremely difficult, to locate tne liver on account of the thickness of the abdominal wall.

In bringing up the subject of suspension for prolapse of the liver, it is like suspension of the prolapsed uterus. We find cases of displaced uteri that produce absolutely no symptoms, and we do not recommend suspension or shortening of the round ligaments in those cases that do not produce any symptoms. All of us find cases in our daily examinations of displaced kidneys, and we begin to quiz patients in reference to the symptoms brought about by displaced kidneys. If a woman manifests no symptoms of displaced kidney, we certainly would not be warranted in recommending an operation, and we simply say nothing about it. I think it was Edebohls who made the statement that one in every five women who have borne children have displaced kidneys. We do not operate for the purpose of fixing the kidney in every fifth woman. If, in examining the abdominal contents of a woman, I find that she has a diplaced kidney, I ask her questions with reference to symptoms referable to the displaced organ, and if she has no symptoms, I say nothing further about it. I like to tell the husband, however, that she has a displaced kidney, but I do not think it is a good plan to tell her about it, or that she has something wrong in the abdomen, because she will begin to worry about it, and will have pain there. There are lots of women who have displaced uteri and displaced kidneys without having any subjective signs whatever, and I think it would be folly to recommend operation in such cases.

Dr. Bernays has said that sometimes the liver might fail to ascend to its original position, and if the abdominal displacement is a normal condition, let it alone.

In bringing up this question, I simply introduced it for the purpose of bringing up future discussion. Many little points occur to one which should be brought up, and if good, we will adopt them and use them constantly. If they are not good and do not promise what they seemed to do at first, we should discard them. Experience should teach one thing or the other. It teaches us that certain procedures are good, while others are absolutely useless. We must find our way by experience, by experiment, and somebody has said that every step in progress in this world costs hundreds, and perhaps thousands, of lives. While experiments may cause pain, yet we are so anxious to relieve our patients of suffering that we subject them to experiments that seem rational. If for a time the liver does relieve the patient, when suspended in this way, and strengthens the other supports and corrects constipation; if those primary causes gradually correct themselves, it matters little whether the ligament becomes atrophied so long as the sysmptoms are permanently relieved.

AN OLD SHOULDER LUXATION—REPORT OF A CASE (Illustrated).

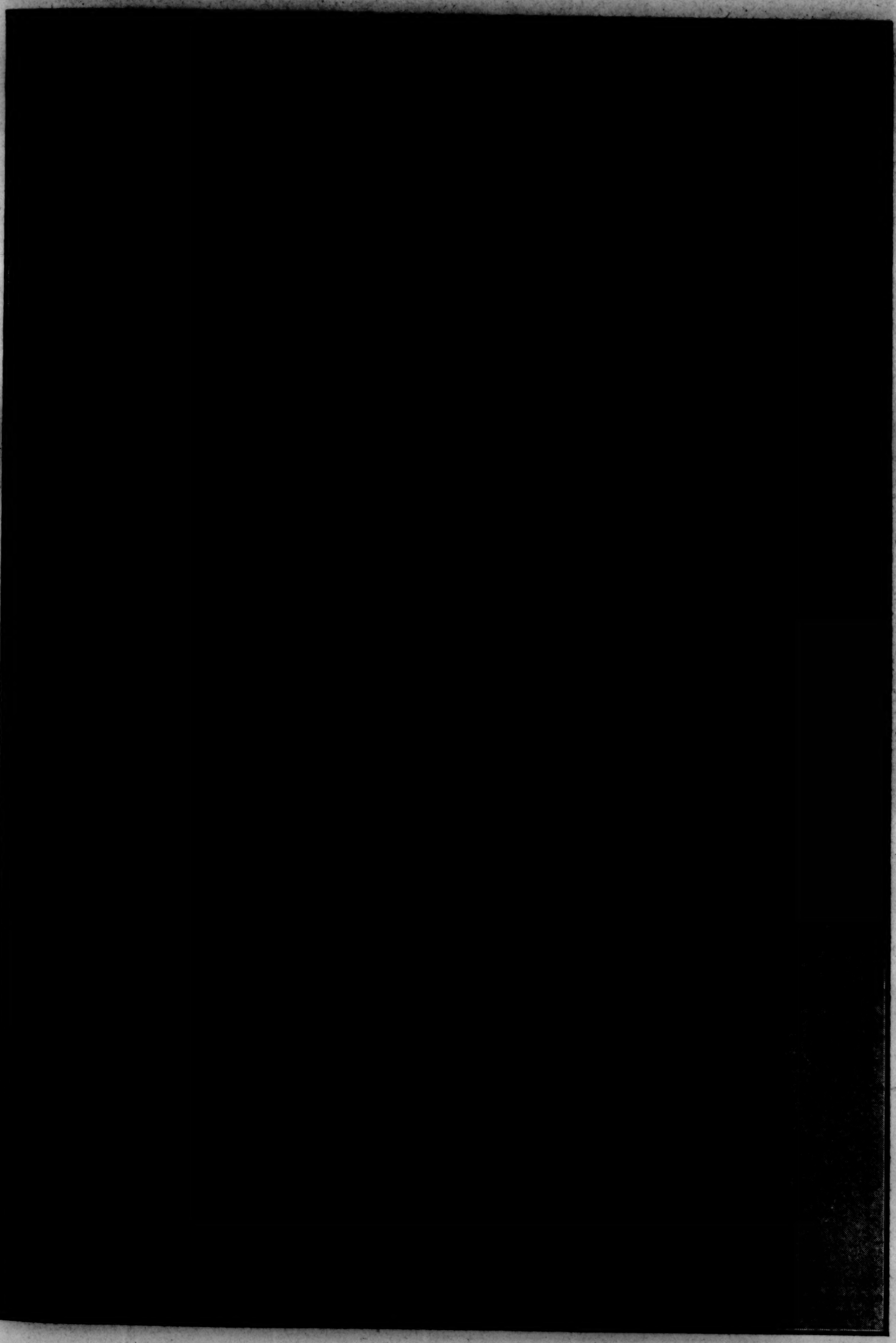
By J. RUDIS-JICINSKY, A. M., M. D., M. E.,
CEDAR RAPIDS, IA.

My object in making this report of an apparently simple case is to show what the X-ray can do for us in the investigation of injuries to the joints, in luxations, fractures, and in observations of the growth of the callus, the bones themselves, etc., and to furnish an aid in the interpretation of the X-ray findings. Before we can interpret correctly the fluoroscopic image or the skiagraph of certain parts, when their relationships are altered by disease or trauma, we should have always before us a skiagraphic picture of the normal parts and in their normal relations. And taking all the other precautions of a proper technique into consideration we cannot then go astray, and, moreover, the eye will be prepared to take in much which it would otherwise fail to see.

A. M., farmer by occupation, 52 years of age, family history good, was injured in September a year ago. On his way home his horses were frightened by a coming train on a crossing and he was thrown from his open wagon to the ground. The result of this accident was a shoulder luxation with some bruises on other parts of the body. He received surgical attendance at once. The diagnosis made was subcoracoid luxation, because two surgeons—good eastern men—were at the time positive that the head of the humerus could be felt in the upper and anterior part of the axilla, beneath the coracoid process. There was also a depression beneath the acromion process and the patient could not place his right hand—the injured one—up on the opposite shoulder. The elbow was carried somewhat forward,

rigidity, pain, swelling, discoloration, etc., following soon. Reduction was tried by manipulation, and finally by extension, both surgeons being satisfied that the head of the bone was in proper place. Dressing applied, arm to side and axillary pad for two weeks. Patient could not use the arm, and new dressing was applied. The condition of the surrounding soft parts seemed to be good, but there was still excessive swelling when another two weeks went by, and the elbow was carried somewhat forward, out and back. Examination made, lotions of aqua Goulardi advised, and passive motion ordered for two weeks. The patient was allowed to use the arm afterwards. This way the case went on up to January 22, 1901, when it was sent to me for X-ray diagnosis, the railroad company wishing not to have any responsibility, because the patient did not care to be treated by the surgeons of the company from the start.

On X-ray examination the head of bone was seen internal to coracoid process, and below clavicle. The bone relationships, the various imparted movements, and the different steps in the development of a new socket, especially the connective tissue bands, could all be studied in a striking way. The fluoroscopic examination made it possible and easy to make an absolutely correct diagnosis post festum, so to say, after elapse of five months, when the luxation became old. It was not our fault that previous uncertainty and error outweighed the possible, definite knowledge. After this examination the endeavor was made to replace the bone by manipulation, and, failing, chloroform anesthesia was decided upon to loosen adhesions and relax contracted muscles and ligaments and if possible cut down. The examination of the heart and lungs, negative. But the anesthesia had to be stopped at once, patient collapsing. Ether was tried with the



same result, and the operation had to be discontinued. In the meantime I have made a skiagraph of the case, a picture which is really interesting, because it shows not only the true condition of the luxation of the right shoulder from behind, new socket formed and connective tissue bands, body and spine of scapula, coracoid process, and glenoid cavity, and the entire position of the head of the humerus, but also the real cause of the collapse of the patient under chloroform. The heart and lungs can be made out very easily on the skiagraph. There is plain evidence of calcareous deposits on the valves of the heart, and isolated foci in the lungs of the same character. The post-mortem made a few months later, when the patient died suddenly with "heart trouble," as the certificate shows, verified the diagnosis.

We all are liable to make mistakes! But these and similar mistakes show beyond a doubt that the X-ray has a future, that it is most wonderfully adapted to this and other work in diagnosis, and that it enables us, with its sensitiveness to presence of earthy salts, to show the very earliest beginnings of accumulation in any part or any organ of the human body, before the knife and the naked eye or usual methods of diagnosis can detect them.

In the case related above, considering the age of the patient, the extensive laceration which perhaps took place, we are inclined to think that the luxation was reduced in the first place, but another took place, due either to alterations of the joint itself or to paralysis of the surrounding muscles; and if it was not reduced right in the start, no wonder that all the further attempts, five months after the injury, were altogether unsuccessful, especially with those complications.

There has been much written about the deceptions of the X-ray tending to depreciate the value of this new method of diagnosis, but the case related above, and

many others, show only too plainly that, when proper conditions are known, the X-ray cannot deceive, its revelations are infallible. Before the pathologist can interpret his microscopic findings, he must know his normal histology; before the ophthalmoscope can be used in a given case, we have to learn how to use the same. And so with the skiagrapher; he has to know all about his apparatus, the technique; he must know and have before him the normal picture, before he can interpret the abnormal; he has to have data upon the picture itself, which will not only enable him to make his measurements, but to reproduce the exact position of the body or limb, for purposes of exploration or operation; he has to have the fluorometer to eliminate the distortion resulting from the radiation or caused by change of position; an apparatus which provides an accurate cross-section of the body or limb, and supplies an absolutely correct right angle, at the intersection of the lines of which the foreign object, the fragments of the fracture, the luxation, the biliary, renal, vesical, or other calculi, etc., will be found in the body. With these and other accessories we are now able to make pictures which are altogether different from others, because they exclude parts which we wish to exclude and give us not only the shadow but the substance also, the internal structure, with beautiful depth and perspective, and help us to make positive diagnosis in many cases.

DISCUSSION.

DR. LEWIS SCHOOLER, of Des Moines, Ia.: Mr. President, I wish to say a word or two of endorsement of the value of the X-ray in old dislocations of the shoulder, and especially in cases where the swelling is so great as to obscure some of the landmarks and render the diagnosis somewhat difficult. It is true nearly all of these cases can be diagnosticated with satisfaction by the examining surgeon without the aid of the X-ray apparatus; but, at the same time, it is a consolation, to say the least, to have one's diagnosis verified by a competent operator of the X-ray machine. I have recently had an experience of that character in re-

ducing a dislocation in the ninth or tenth week after the primary dislocation. It was said to have been reduced by another surgeon at the time. The patient had considerable inflammation in the vicinity of the joint, a great deal of swelling and neuritis in connection with it from the pressure, making it somewhat difficult to determine the exact condition of the head of the humerus, but which was cleared up readily by means of the X-ray, and the dislocation was successfully reduced after considerable difficulty, and has remained in good condition since. So it is easy to conceive that in some of these cases the X-ray will prove very valuable. However, if imperfectly used, it is capable of deception, and it sometimes requires more than a single examination by the X-ray to accurately determine the condition. The author of the paper called attention to the value of the X-ray in this class of cases, and I have no doubt it will prove of equal value in many other cases.

DR. RUDIS-JICINSKY (closing the discussion): I have only a few words to say. By means of the X-ray, in cases where a plaster-of-Paris or any other dressing has been applied, we can determine readily if the fragments are in apposition, or if we have accomplished our object in reducing the dislocation.

TREATMENT OF IRREDUCIBLE BACKWARD DISLOCATION OF THE ASTRAGALUS BY OPENING THE JOINT AND REPOSITING THE SAME.

BY W. JEPSON, B. SC., M. D., L. R. C. S. ED.,

SIOUX CITY, IA.

It seems somewhat remarkable that the astragalus, occupying as it does such a sheltered position beneath the tibio-fibular arch, and being so firmly secured in this relationship by the tibio-tarsal ligaments, and resting so solidly upon the os-calcis to which it is so securely united by the interosseous ligament, is more frequently separated from all the bones with which it articulates (thus constituting a total or double dislocation), than from any of them separately, as in tibio-tarsal or subastragaloid dislocations. Yet such is the fact conveyed by statistics so far gathered. The accident is, however, certainly of rare occurrence, for of 812 cases of dislocation of all bones observed at St. Thomas's Hospital, London, only two were of the as-

tragalus, while in Kroenlein's series none occurred. The character of the violence capable of bringing about this dislocation is not readily determinable from the recorded histories of cases so far reported. In general, however, it is presumed that hyperextension is responsible for the backward dislocations, and hyperflexion for those of the forward type.

Total dislocation of the astragalus is classified by most authorities as being: Forward; forward and outward; forward and inward; backward; dislocation by rotation. Of these varieties it appears that forward and outward is first in order of frequency, forward and inward comes second, while those where the bone is displaced directly forward or backward are of such infrequent occurrence that the recorded cases are hardly sufficient for a comparison. It is to the latter variety that I desire especially to call your attention, in connection with the case which I will now present to you.

Mr. H., on the morning of September 2, in his attempt to prevent being thrown from a fractious horse which he was riding, caused it to rear, with the result that he and the horse were thrown backward to the ground, his foot being caught between the seat of the saddle and the ground, so that it was forcibly extended and, as he thinks, twisted in, or adducted. The accident occurred at 7 A. M., and at 12:30 the same day he entered the St. Joseph Hospital at the instance of his physician, Dr. Maxwell, and his consultant, Dr. Schlawig. Two careful attempts at reduction under complete anesthesia had been made prior to his entering the hospital. The symptoms present were, inversion of the foot, with preternatural immobility at ankle-joint. Both malleoli were intact, and occupied a lower position than normal. The space between the external malleolus and tendo-achilles was occupied by what was made out to be the astragalus. The soft tissues over the displaced

bone were stretched, indicating that no great amount of additional force would have been necessary to cause it to give way, while the defective circulation in this structure would certainly have led to its early necrosis had it not been relieved of the underlying pressure. The patient was again anesthetized, and an effort made at reduction, which, however, failed completely. At no time during these manipulative procedures was there any evidence of possible ultimate success, for the bone remained firmly lodged in its new position under all circumstances.

Reduction being impossible, we had the alternative of following one of the two plans of treatment advocated by writers upon this subject, namely, leaving the bone in situ, or else removing it. As neither of these plans gave promise of as good a result as could be wished for, it was therefore decided upon to open the joint and attempt to reposit the bone, provided it was possessed of sufficient ligamentous attachment to make its continued vitality probable through the vessels it contained. The joint was therefore opened by a curved incision beginning at the astragalo-navicular articulation and extending back to the tendo-achilles, passing under the internal malleolus.

It was found necessary to sever the tendons of the tibialis posticus and flexor longus digitorum in order to secure adequate access to the joint. The posterior tibial artery and nerve, and tendon of the flexor longus hallucis were held aside by retractors. Upon inspection it was found that the bone had been fractured at the neck, the remaining head consisting only of the articular cartilege, and probably not more than a quarter of an inch of the underlying cancellous bony structure, which was comminuted, some of the pieces lying loosely in the joint cavity; hence they were removed.

The dislocated bone was found to be entirely rotated

upon its lateral axis, so that the surface for articulation with the tibio-fibular arch pointed toward the os calcis, while the fractured end pointed toward the tendo-achilles. Considerable difficulty was experienced in dislodging the bone from its position and securing its rotation. It, however, was accomplished by forcible traction with the index finger hooked over what was then the posterior part of the bone, while the foot was forcibly everted. As much care as possible was exercised to not cause any further separation of such ligamentous attachments as existed on the external aspect, so as not to further compromise its vitality through deficient nutrition, recognizing that the bone to a large extent receives its blood supply through the interosseous ligament; and as this was torn as well as its internal, anterior and posterior attachments, I entertained considerable doubt as to whether the vitality of the bone would be maintained. However, the risk was assumed and the bone replaced. The tendons were sutured, and the joint closed, the subsequent history of the case being uneventful.

The result you can determine for yourselves by an examination of his foot. I believe it will be admitted by most of you that the result is far better than would have been the case either from the removal of the astragalus or leaving it in the abnormal position occupied by it. Flexion and extension being good, and absence of pain and deformity, as well as an ability to use the foot, seems to me a result not far short of the best that could be hoped for at this time. That the articulation is as secure as if the accident had never occurred, I am not prepared to say, for I doubt this, as it seems reasonable to suppose that this could not be true; yet the support afforded by the tendons passing from the leg to the foot I believe will afford it adequate support under all ordinary circumstances.

I herewith append a table of the cases so far reported of this injury. It is largely arranged from the last edition of Stimson's classical work on Fractures and Dislocations:

NAME.	Number cases	Number fracture astragalus	Fracture of neck of astragalus	Displacement. Backward	Backward outward	Backward inward	Compound	Reduced. Fracture	No fracture	Unreduced	Subsequent treatment	Result
Phillips	2	2	.....	2	.....	.....	.....	.....	.....	2	Astragalus left in situ	Reported to be good in three of the four cases.
Lizars	1	1	.....	1	.....	.....	.....	.....	.....	1		
Liston	1	1	.....	.....	.....	.....	.....	.....	.....	1		
Turner	1	1	.....	.....	1	.....	.....	.....	.....	1	Astragalus removed.	Not stated.
Nelaton	1	1	.....	1	.....	.....	.....	.....	.....	1	Astragalus removed.	Death.
Denon Villiers	1	.....	1	.....	.....	1	1	.....	.....	1		
No Name, Lancet, Vol. II, p. 159	1	1	.....	.....	.....	1	.....	.....	1	.....	.....	.....
Blatin	1	1	.....	1	.....	.....	.....	.....	1	.....	.....	.....
Lejeuna	1	.....	1	1	.....	.....	1	.....	.....	1	Astragalus left in situ	Not given.
McCormick	1	.....	1	.....	.....	1	1	.....	.....	1	Astragalus left in situ.	Recovery with good use of limb.
Pachored	1	.....	1	.....	.....	1	.....	.....	.....	1	Amputation following suppuration	.....
Cheever	1	.....	1	.....	.....	1	Soft structure sloughing	.....	.....	1	Astragalus left in situ.	Recovery with good use of limb.
Minerve	1	1	.....	.....	.....	1	.....	.....	1	.....	.....	.....
Stimson	1	.....	1	.....	.....	1	.....	.....	.....	1	Astragalus removed.	Death from pneumonia on 9th day.
Clark	1	.....	1	.....	.....	1	.....	.....	.....	1	Astragalus left in situ.	Recovery with good use of limb.
Jepson	1	.....	1	.....	1	.....	.....	.....	.....	1	Joint opened and astragalus replaced.	Complete restoration of function of joint and foot.
	17	9	8	7	2	8	3	0	3	14		

From this table we observe that of the seventeen cases thus far recorded there have been nine dislocations uncomplicated by fracture of the neck, while eight have thus been complicated. In the nine cases uncomplicated by fracture, the displacement has been backward in six instances, backward and outward in two, and backward and inward in one. Of the eight cases complicated by fracture of the neck, the displacement occurred backward and inward six times, backward once, backward and outward once, the last displacement only occurring twice in the series. In what per cent. of the cases above cited the astragalus was rotated upon its axis, so that its tibio-fibular articulation looked downward as in the case here presented, I am not able to learn. Reduction was only accomplished in three of the seventeen cases. These three cases were all instances of dislocation of the bone uncomplicated by fracture. Of the fourteen unreduced cases, the astragalus was left in situ in eight instances, with the report that the patients recovered with good use of the limb. This seems the more remarkable when it is considered that in two of these eight cases the dislocation was compound, in one being compound at the time of the accident and the other through the sloughing of the overlying soft structure. Aside from this obstacle in the way of securing a good result, I cannot help believing that the astragalus occupying such an abnormal position must markedly impede normal flexion and extension at the ankle; and leaving out of consideration all other disturbance, it seems to me it would require a considerable stretching of one's imagination to say that such an ankle would be good and useful. The astragalus was removed in four instances, death resulting in two of these. Amputation was necessitated in one instance by reason of the septic infection presumably following upon sloughing of the overlying

soft structure. In none of these cases does there seem to have been any effort made at replacement of the displaced bone after the joint was opened. This, however, may be explained by the fact that many of these accidents having occurred prior to the perfection of aseptic surgical technique it was safer to remove the astragalus than to reposit it. However, this can be no valid reason for the perpetuation of such advice by our modern writers of surgical works, for nearly all of these works with which I am acquainted advise the removal of the astragalus if reduction is impossible, or else advise it being left alone. In summarizing:

1. My own experience and the results of recorded cases lead me to believe that it will rarely be possible with our present knowledge and technique to bring about a reduction of a backward dislocation of the astragalus without opening the joint and bringing about a reposition of the bone by direct manipulation.

2. With our present command of aseptic surgery I see no reason why this should not be undertaken in all cases uncomplicated by severe infection, with good prospects of securing a nearly perfect result.

3. Removal of the astragalus being reserved for such cases where the bone is completely separated from its ligamentous attachments, consequently having no adequate source of blood supply.

4. Amputation being resorted to only in such cases where the dislocation is compound and infected to a degree impossible of removal, and the patient's life jeopardized by the septic intoxication or infection.

DISCUSSION.

DR. LEONARD FREEMAN, of Denver, Colo.: Mr. President—The author of this paper mentioned that he opened the joint with the idea of replacing the bone in its proper position, providing its ligamentary attachments insured the nutrition of the bone. I should like to suggest, or, at least, it is my understanding of such a question, that the life of the bone does not depend so much upon the ligamentous attach-

ments as it does upon whether infection has taken place or not. If infection does not take place, the bone might be replaced in any case without losing its vitality.

DR. JOHN B. MURPHY, of Chicago, Ill.: This is an interesting and instructive case, and I feel that we should not let the paper pass without emphasizing the importance of the work outlined in it. I congratulate the essayist on the excellent result he obtained in this case. The last speaker (Dr. Freeman) has very wisely said that the nutrition of bone does not depend so much upon the ligamentous attachments. This is the case in the class of bones that receive their supply from the cartilage. We know that cartilage in a free joint is a living body, and not a dead one. Furthermore, we know that we can separate a bone entirely from its blood supply in any position in the body, and so long as it remains aseptic it will apparently live. But it will not live, but die, if it be one of the long bones. This case comes under an entirely different classification. If the fragment, which is a part of the long bone, is entirely separated from its blood supply, both from periosteum and from its direct bony supply, as I have pictured it, it will apparently die, and we have been taught for many years that these free fragments were revitalized. Recent experiments, however, show that these bones are not revitalized. As I have said, this case comes under a different class, and that is the basis on which this result is obtained.

DR. ALEXANDER HUGH FERGUSON, of Chicago, Ill.: We all know that the astragalus is the meanest bone in the whole body to treat, inasmuch as it receives less nutrition. It is true, as Dr. Murphy has said, that it receives its nutrition very largely from the cartilage by imbibition. But this bone has also fibrous attachments on the outside. These would give it additional nutrition to what it would receive by imbibition. The essayist is to be congratulated on the result, and his patient ought to be happy. We should pass commendation on such work as this.

DR. GEORGE N. KREIDER, of Springfield, Ill.: I would suggest the application of a little device that is used by athletes. I understand, from what the essayist has said, that his patient has a little lameness. In these injuries of the ankle-joint there is a splint made of very thin leather which can be laced up in front, and it can be obtained from Spalding Brothers in Chicago. It facilitates the cure, and assists a great deal in strengthening the joint, and in such a case as this I think the essayist might apply this splint with benefit to his patient.

DR. JEPSON (closing the discussion): I have nothing to say except to thank the gentlemen who have so kindly discussed my paper. With reference to the nutrition of the bone, I am not unmindful of the fact that it should live on a limited amount of nutrition. The interosseous ligament was torn, and it is an anatomical fact that is admitted by every one that vessels pass along from this ligament into the bone, and if they do, they pass over the parts presumably assisting in nutrition, and that the main source of supply was cut off in this case. How extensive those attachments were, I am not prepared to say. I conceived the

idea that the bone would live on a good deal less nourishment than it ordinarily received, and I ran the risk, and you see the result before you.

SOME INTERNAL INJURIES OF THE KNEE-JOINT.

By M. L. HARRIS, M. D.,
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PROFESSOR OF SURGERY, CHICAGO POLICLINIC.

The knee-joint is the largest joint in the body. It contains the largest amount of articular surface and synovial membrane, and as it is subcutaneous and lies in an unprotected location, it is particularly liable to injury.

It is the intention of the author in this article to briefly call attention only to two varieties of injuries to the inner structures of this joint, which, the author believes, are more common than the attention heretofore given them would seem to indicate. Recalling the anatomy of this joint, it will be remembered that the convex surfaces of the condyles of the femur rest upon the slightly concave surface of the upper end of the tibia, while anteriorly the patella articulates with the intercondylar articular surface of the femur. As the convexity of the articular surfaces of the condyles of the femur is greater than the concavity of the articular surface of the tibia, a somewhat triangular space remains surrounding the point of contact of these two bones which is partially filled or obliterated by the intra-articular semilunar fibro cartilages. There remains anteriorly, however, between the lower end of the patella and the patella ligament in front and the femur and tibia respectively above and below, a somewhat triangular space of considerable size, which normally is occupied by a mass of fat and connective tissue, lined on its inner or articular aspect with

synovial membrane. The size and triangular outline of this space is well shown by the accompanying skiagraph of this region. (Fig. 1.) By comparing Fig. 1, which represents this joint in a state of extension, with Fig. 2, which represents it in a state of flexion, it will readily be seen that there is considerable difference between the outlines of the triangular space in the two states of the joint. It is the function of the mass of fat

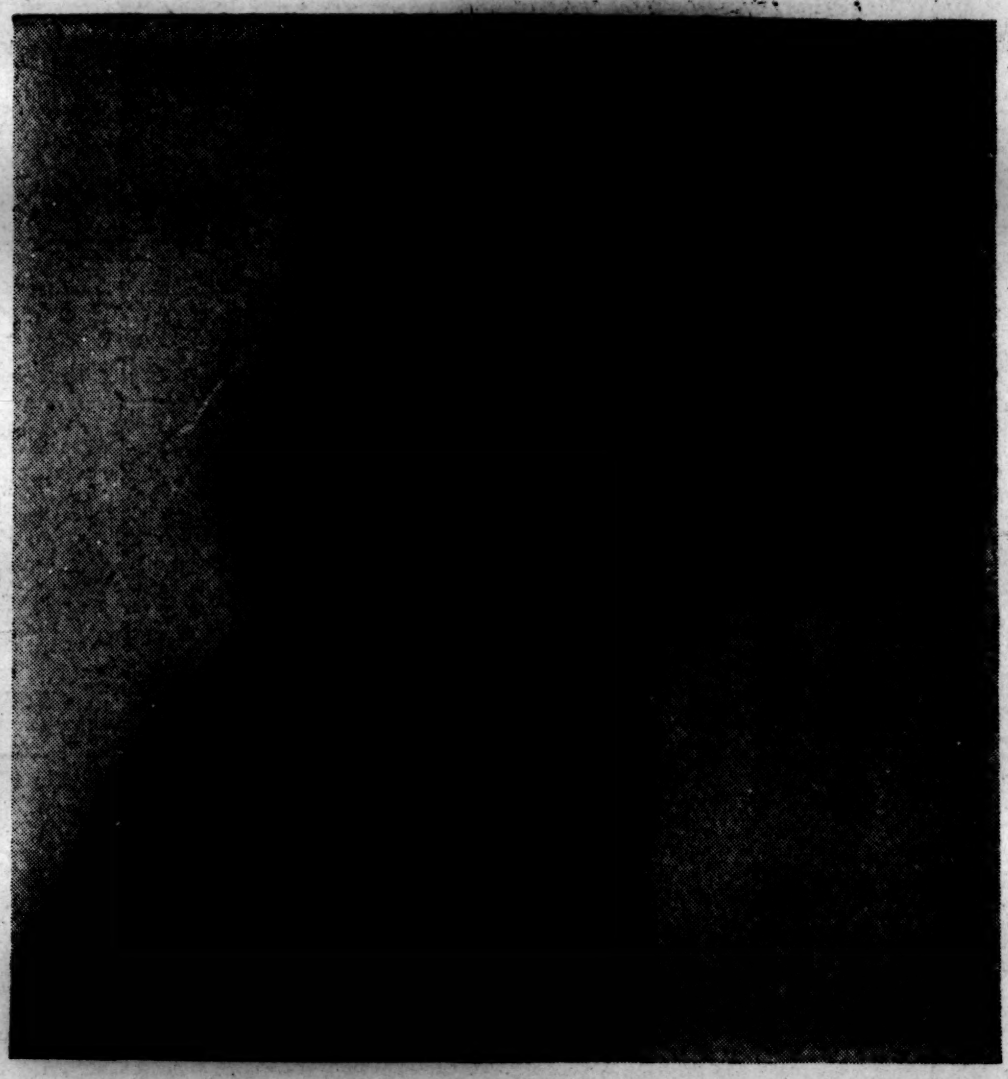

FIG. 1

with its synovial lining to mould itself constantly during motion of the joint to the varying outline of the space which it fills. Atmospheric pressure keeps the apex of the mass constantly crowded into the receding angle between the femur and tibia. The apex of this mass, made up of a fold of synovial membrane, is what is known as the ligamentum mucosum. It is injury to this triangular mass of fat and the ligamentum mucosum to which attention is first directed. An injury here may be produced in one of two ways: First, by

the direct application of force, as may occur in a fall upon the knee, or by the forcible impingement of a more or less pointed object against this portion of the joint; and second, by pinching or crushing the apex of the mass in the angle between the femur and tibia, as may occur when these bones are slightly separated during hyperflexion or sudden wrenching. In this case the apex or synovial fold of the mass is forced by

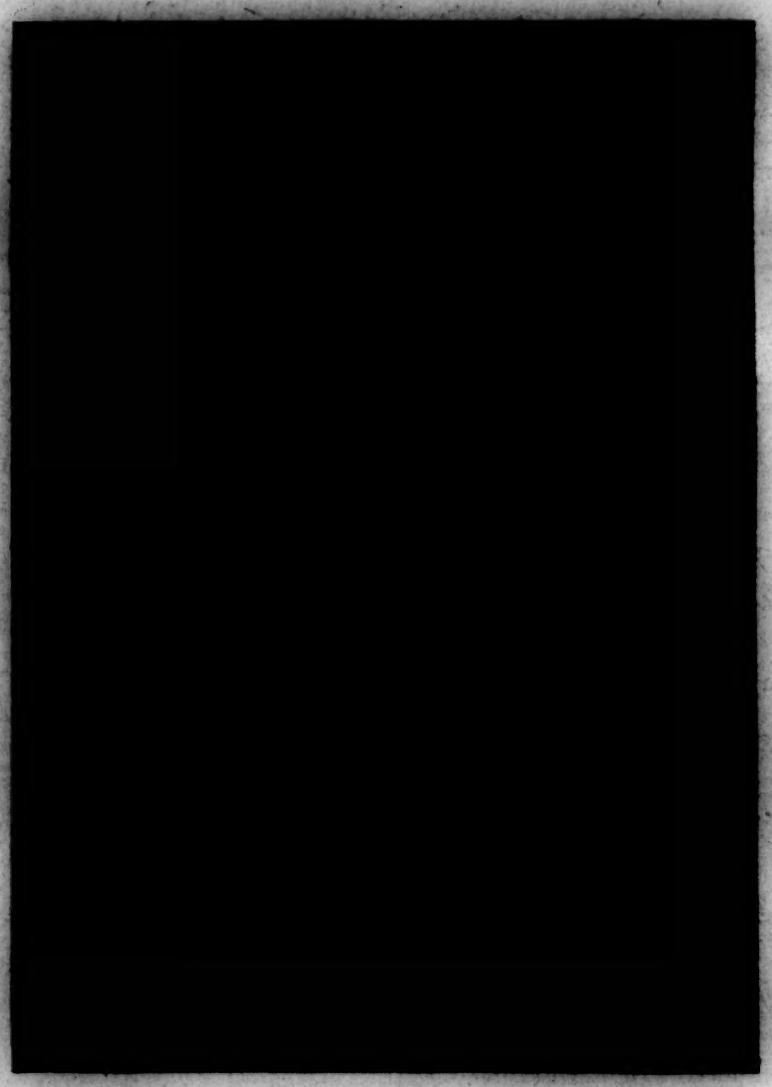

FIG. 2

atmospheric pressure into the slight gap between the bones, where it is suddenly nipped or pinched. A small hemorrhage may take place in the fold, which may become organized, thus forming a mass of new connective tissue, which will persist indefinitely as an irregularity on the edge of the fold. This new-formed mass or irregularity is subject to unequal pressure during motion of the joint, and as it is well supplied with nerves it is sensitive and pressure upon it produces pain.

The clinical history of a case of this kind may be described as follows: Upon the receipt of an injury, as for instance a fall upon the flexed leg, thus producing hyperflexion, the patient experiences an acute pain in the knee-joint and the joint becomes swollen. After treatment with fixation, rest, etc., for the usual length of time, it is found on attempting to get around again that the knee remains more or less painful and tender. Pain is particularly apparent on standing or going up and down stairs. Occasionally during certain motions of the joint acute pain of considerable severity will be experienced, which the patient will often locate just below or to one or the other side of the patella. Pressure carefully applied to this region by the tip of the finger may detect a spot which is very sensitive, and pain may be produced thereby which the patient will state is similar to the acute pain experienced at times during motion of the joint. If the joint be fixed and no weight placed upon it, the pain disappears, only to return again, however, when an attempt is made to use the joint. As illustrating this variety of injury the following case may be mentioned:

Miss E., aged 33 years. About two and a half years ago she was thrown from her bicycle. She fell with her left knee flexed under her. Upon attempting to extend the leg the pain produced was so acute that she fainted. The knee was treated by rest and ice bags for twenty-eight days, when she was able to walk about and use it some, although it was still painful. As the pain seemed to increase rather than to diminish the joint was fixed in a plaster-of-Paris cast. This treatment was continued for about five months, the cast being renewed from time to time. No material improvement apparently followed this immobilization, for although there would be no pain while in the cast, when this was removed and an attempt was made to

use the leg, or to bear weight on it, the old pain would return. Massage, local applications, liniments, etc., were now diligently tried, but at the end of two and a half years her knee was in much the same condition as in the beginning. At this time she came under my care. She described the pain as a more or less continued soreness with an occasional sharp, severe pain during certain motions. She would locate the pain as extending across the joint just below the patella. There was no swelling present. On palpating carefully a small spot was found just to the outer side of the ligamentum patellæ and opposite the line of articulation between the femur and the tibia, which was quite sensitive, and pressure upon this spot produced the same kind of acute pain which she complained of. Suspecting a localized injury of some kind to the inner structures of the joint at this point, an operation was advised and the joint opened by a slightly curved external incision January 18, 1901. On the free edge of the ligamentum mucosum, a little to the outer side of the center, was found a whitish fibro-connective tissue mass about one cm. in width and projecting about 5 mm. beyond the free border of the ligament. It was 2 to 4 mm. in thickness, and its surface showed evidences of compression. Its free edge was irregular and ragged looking. The mass was removed with the scissors and the synovial membrane stitched with fine catgut. The joint was closed and immobilized. Primary union. The recovery was perfect, and all the former pain disappeared. The presence of this little mass may be explained by supposing the ligamentum mucosum to have become nipped or crushed at this point between the tibia and femur during hyperflexion of the joint, which undoubtedly took place when the patient fell. A small hemorrhage occurred in the tissue with organization of the clot. The hyperplasia of connective

tissue formed the little mass which was constantly pressed upon during motions of the joint.

The second variety of injury to the knee-joint to which attention will be directed is the forcible detachment of a piece of articular cartilage from the articular surface of one of the condyles of the femur. It will be seen that the articular surfaces of the condyles become more and more exposed on either side of the patella and its ligament as the joint is flexed. In the flexed state of the joint this articular surface may therefore be injured by the direct application of force, as may occur in a fall upon the knee, or by a hard body striking against this region. The application of force in that manner may cause the detachment of a small piece of the articular cartilage, which may remain completely severed from its base, or if near the edge of the articular surface may remain attached by a small pedicle of synovial membrane and connective tissue. Koenig (Deutsch. Zeitsch. f. Chir., Bd. 27, s. 90) is of the opinion that a pathologic condition of the articular surface, which he terms osteochondritis desiccans, precedes the detachment of the piece of cartilage in these cases. It has been abundantly demonstrated, however, that traumatic detachment of the articular cartilage may take place in perfectly normal joints. The clinical history of these cases is that of a loose body in the joint, or so-called "gelenkmaus." After the immediate effects of the injury have passed away, the patient may experience no pain or trouble in the joint for some time, even weeks or months, when while walking or making some movement of the joint a sudden acute pain is experienced in the knee, the joint is rigidly fixed by muscular spasm, and cannot be moved without the most excruciating pain. After a moment's rest, or some slight manipulation of the joint, the spasm relaxes, the pain disappears and the joint be-

comes freely movable again. Some swelling and soreness may be present for a few days when the parts return to their normal condition and no further trouble is experienced until the next attack, which may occur at any time from a few days to several weeks or months. In other cases general symptoms, such as soreness with a small amount of effusion, persist in the joint during the interval between the acute attacks. The following case, which illustrates this variety of injury, is of particular interest, owing to the great length of time—32 years—during which the symptoms persisted:

Mrs. B., aged 44. When 12 years of age, or 32 years ago, the patient fell, striking on her left knee. The knee became swollen and painful, but under rest and local applications these symptoms disappeared. Ever since that time, however, the knee has been sensitive and subject to periodic attacks of acute pain and tenderness, accompanied with redness, heat and swelling. During these attacks she would be compelled to remain in bed and rest the knee. After the subsidence of the acute symptoms the knee would apparently be all right for some time, when suddenly during some peculiar motion or twist of the knee she would have an acute pain with fixation of the joint, followed by swelling, etc., which would lay her up for a few days again. Such attacks have recurred at intervals of a few weeks for 32 years. The last attack, about five weeks ago, was more severe and persistent than the others, and she was compelled to keep to the bed a longer time than usual. When she got up walking remained painful. Becoming thoroughly discouraged with her condition she was sent to me October 6, 1901, ready to submit to any operation, even to the loss of the knee-joint, in order to be rid of her trouble. On examination a small mass could be detected by palpation of the outer condyle of the femur at the edge of

the articular surface. The mass was sensitive and tender, somewhat movable, but could not be made to disappear. It was thought to be a detached portion of cartilage, and an operation was advised. The joint was opened by an external incision October 9th, 1901. The mass was found to be a piece of the articular cartilage, which had been detached from the articular surface of the external condyle of the femur. It was about 2 cm. in length by 1 cm. in width and remained attached by one end to the bone just beyond the articular surface by a small pedicle of synovial membrane and connective tissue. The defect in the articular cartilage corresponded in size and shape to the detached piece of cartilage. During the 32 years there had not been the slightest attempt to repair the defect in the cartilage, and the bone exposed looked as fresh as though the accident had occurred but recently. The piece of cartilage was removed and the joint closed. Primary union.

These cases illustrate the serious and persistent disablement that may occasionally result from comparatively slight pathologic changes affecting the inner structures of the knee-joint, and show the necessity of operative treatment in those cases following an injury, in which the characteristic symptoms above described persist after the usual treatment of the joint by rest and immobilization.

DISCUSSION.

DR. A. C. BERNAYS, of St. Louis, Mo.: Mr. President—The author of this paper has directed our attention to a part of surgery which has been treated in the past in a somewhat stepmotherly manner. Our text-books do not say anything about injuries to the ligamentum mucosum and very little about loose cartilages which are the result of cracking or breaking loose of small parts of the articular ends of the bones. The pathology and explanation which the doctor gave of injury to the ligamentum mucosum in the case which he reported are new to me. I do not believe that I have met with a similar condition in the literature, and therefore we ought to be congratulated upon having this

subject brought before us for the first time. Of course, not having seen a case of this kind, I am unable to say much about it. But I am reminded that in my own practice I have seen a number of obscure troubles of the knee-joint, in which I believe now, looking back over what I can remember of some of them, that the injury was probably such a one as the doctor demonstrated by cutting open the knee-joint. I know that some of these obscure, painful lesions are liable to be thrown into the great waste-basket which we all make use of occasionally, which we call neuropathic troubles, which no one can define, and which I believe largely originate in the minds of physicians. Every time, when one of those things is thrown into the waste-basket and is rescued by one of our number and brought to light and explained in a rational way, it signifies progress in our science and art.

DR. A. E. HALSTEAD, of Chicago, Ill.: In connection with the excellent paper of Dr. Harris, I wish to say that a frequent cause of pedunculated bodies in the knee-joint is injury to the ligamentum mucosum. It is a well-known fact that the synovial capsule of the joint contains and has carried throughout its inner surface cartilage cells, and, as the result of injury or chronic inflammation, cartilage cells may develop and form a circumscribed cartilaginous growth in the capsule. At the time the growths become drawn into the knee-joint, they assume the form of pedunculated bodies. Ultimately they may become loosened. The same thing holds true with reference to hemorrhages into the capsule of the joint, and the proliferation of connective tissue above these hemorrhages. I disagree with Dr. Bernays that Dr. Harris has given us a new pathology. I do not think Dr. Harris himself claims it is new. This was mentioned years ago in the treatment of movable bodies in the knee-joint.

Another frequent cause of floating bodies in the knee-joint is the development of cartilage in the joint villi, a fringe being found on the ligamentum mucosum. The mechanism by which the cartilage becomes displaced is rather peculiar. It is not due to hyperflexion or hyperextension, as was formerly supposed, but to rotation of the tibia when the joint was in position halfway between extension and flexion.

Another point that it might be well to mention is that these dislocations occur sometimes after chronic inflammation has been in progress; that is, the inflammatory condition is primary, the inflammation causes a relaxation of the ligaments of the joint and permits hyperrotation which terminates in dislocation of the cartilage.

I disagree with Dr. Harris as to the frequency of movable cartilages in the joints being due to trauma, or the immediate effect of trauma. Very few such cases are on record. A few cases have been published where the joint has been opened immediately or a skiagraph has been taken and a portion of the cartilage has been found to be fractured. The explanation of Koenig is probably the correct one to apply in most cases, namely, that the separation of the cartilage takes place some time after the injury, and this

may be several months or years. The fact that we find a defect in the articular surface of the bone corresponding to the size and shape of the loose cartilage does not argue that it has been broken off. Such cartilage may develop without injury from detached cartilage cells of the capsule of the joint, or from detached villi and pressure atrophy causes a depression in the articular surface of the bone which closely corresponds to the size and shape of the cartilage.

DR. JOHN B. MURPHY, of Chicago: I am very much pleased with the paper of Dr. Harris. He brought out an important point in this matter, and I desire to cite a case in connection with this subject. I operated on a patient some ten days ago, and some of the gentlemen present saw me do the operation. The diagnosis was made with the assistance of the X-ray, a picture of the cartilage having been made at this point (indicating). But there was no cartilage there; there was merely an elongation of the ligamentum mucosum which had flattened out. There was a ligament three-eighths of an inch in length that passed down through the joint and out to the opposite side. It looked like a free crucial ligament, but not the entire length of its attachment. In looking for the cartilage, after making the incision, the attachment to the ligament from that point to this (indicating) was perfectly free throughout its entire extent. The boy had a history of repeated paroxysms in walking. After each attack he would have inflammation of the ends of the joint, effusion and swelling, which would last two or three weeks, until finally he became practically incapacitated. Locomotion was greatly impaired as the result of impingement of this dense fibrous mass between the bone. This is the only case of this kind I ever saw.

DR. GRANT: Was there a posterior attachment?

DR. MURPHY: Yes. Whether this was congenital or an acquired condition, I do not know.

DR. A. C. BERNAYS: I was evidently misunderstood by the first speaker (Dr. Halstead). I did not mean to convey the idea that Dr. Harris has given us a new pathology of foreign bodies in the knee-joint, and what Dr. Murphy has described is not a foreign body in the knee-joint. I do not think he meant to say it is a foreign body. The origin of these things is not the same, pathologically speaking, as the origin of free cartilages. Furthermore, I want to say that Dr. Hall, of Kansas City, saw me operate on a case in which a piece of the femur had cracked off, entirely separated from its bed, which, when I opened the knee-joint, fell out of place. It seems to me that the only rational explanation for a foreign body which lies in a bed, accurately fitting each elevation and depression on its surface, cannot be of any other origin than traumatic. Therefore I consider traumatism to be one of the common causes for free bodies in the knee-joint.

DR. HALSTEAD: I would like to ask Dr. Bernays how long he operated after the injury.

DR. BERNAYS: There was no history of a definite injury. The patient had numerous slight injuries, according to his story, and he had had more or less trouble with the joint for

ten years. Still I cannot doubt for a moment that this piece of the femur was lifted out from its bed easily, without any trouble. It fell out, and left, after its removal, a deep cavity of the size and shape I show you here (illustrating). Its surface was shaped like this (indicating), perfectly smooth, and had cartilage on it, while the posterior surface was cancellated bone. But the outer lower surface, this irregular line which I show you here, was somewhat cartilaginous. In the interior there was cancellated bone, showing that there must have been broken off a piece of the femur. As I have previously remarked, I believe trauma is the most common origin of foreign bodies in the knee-joint. Cartilage cells in synovia are rarely a cause of foreign bodies in the knee-joint. Of course, we are discussing a subject which neither one of us can prove. You cannot prove that they originate from cells in the synovia, nor can I prove that they originate from traumatism.

DR. HALSTEAD: The case mentioned by Dr. Bernays illustrates what one author has described as osteochondritis desiccans. There is no doubt at all the piece of femur was broken off, or it came off as the result of fatty necrosis. It is primarily the result of trauma interfering with the nutrition of the bone, and this sequestrum is thrown off in the course of time. While we cannot say positively that this is the case, it appears to me to be a more rational explanation than direct traumatism.

DR. LEWIS SCHOOLER, of Des Moines, Ia.; The author of the paper very clearly traces these cases to a distinct injury of great severity, but there are a number of cases in which there is no history of injury. There are also cases in which villous growths occur along the fringe of the synovial membrane and sometimes undergo degeneration and form cartilage. They may not always be loose in the joint, but they may be formed along the edge of the ligament. They never form true bony growths, and the ligaments, as a rule, are not involved. But I have seen one case in which there was the formation of cartilage as broad as two fingers and two inches long following a line on the inner and outer surfaces of the knee-joint; yet there were these villous pear-shaped growths that were vascular. I think later pathology shows they have been traced to the effects of a bacillus or a germ; but in the case of loose bodies either with or without a history of injury there is no such pathology. It is not uncommon to find cases described of bodies, either loose or partially so, clinging to the fringes of the synovial membrane, in which we have no history of injury at all. We have been led to believe that there were injuries, perhaps repeated slight traumatisms, but they pass out of the mind of the patient, and these patients come to us complaining of a category of symptoms which everyone recognizes as being either tubercular or some affection of the ligamentum mucosum, or the synovial membrane. I have no doubt a large number of cases are sometimes classified as tuberculous, and many others are simply cases of repeated traumatisms of the ligamentum mucosum.

DR. HARRIS (closing the discussion): The discussion has wandered a little from the subject of my paper, as I feared

it would. In the first place, the cause of movable bodies in the knee-joint was not touched upon at all. As far as bringing forth anything new is concerned, I am always a little slow in making any such claims; but I must say that the mechanism of pinching the triangular mass by hyperflexion of the joint and by atmospheric pressure, so far as my reading goes, is new. There is no reference to the subject in any literature that has been accessible to me, that is, in so far as an explanation of this particular injury goes. I made no statement to the effect that the most frequent way of producing movable bodies was by detachment of the articular cartilage. I did not touch on the subject or method of production of loose bodies in joints.

Koenig's paper on osteochondritis desiccans was written fifteen years ago, based on three cases which he had observed indefinitely himself, because he had indefinite knowledge, so that upon these cases he based the theory that the disease always preceded detachment of the articular cartilages, and this disease which preceded it was not the result of trauma, but the diseased condition was the cause of the cartilage becoming detached subsequently by the injury. That was his idea. He said he did not think it possible that detachment of the articular cartilage could be brought about by trauma in a perfectly normal joint. I will say further, that in my subsequent study of these cases there is almost no one who reports a case who does not reach the conclusion that Koenig was wrong. One of the most recent writers, who has collected the largest number of cases in the literature of detachment of the cartilage, cases which were actually observed from the day of the injury to the subsequent operations, and cases that occurred in the army where the patients were under supervision, came to the conclusion that these cartilages are detached directly by trauma, and that diseased cartilage preceded by trauma is extremely rare. So much for Koenig's theory.

With reference to the remarks concerning synovial fringes, I did not consider that phase of the subject at all, and consequently it needs no discussion.

TREATMENT OF DISLOCATION OF THE CLAVICLE THROUGH OPEN WOUND, WITH REREPORT OF CASE.

By JAMES E. MOORE, M. D.,

MINNEAPOLIS, MINN.

About two years ago I treated a railway passenger conductor for a fracture of the clavicle and a dislocation upward of the outer end of the same bone. The union of the fracture was excellent, showing that the parts were well held by the dressings, but the result

from the dislocation was very bad. The bone stands out so prominent that it can be felt through the clothing, and the patient tells me that he can no longer help the baggageman handle trunks as he was accustomed to do when they were in a hurry, because that shoulder is weak and becomes painful when he attempts to lift a heavy weight.

The fact that this is the usual result following this accident when treated by bandages, adhesive straps or plaster of Paris, affords the conscientious surgeon but little consolation. Some recent writers have advocated treatment of this dislocation by wire suture, but I have been unable to find any literature upon the subject. Quite recently I have treated a case by cutting down upon the dislocated bone, replacing it and the surrounding soft parts and fastening them there by means of silver wire and catgut sutures. The result is so satisfactory and the findings were so instructive to me that I thought they would interest the members of this society.

The patient, L. M., aged 18, was referred to me on September 17, 1901, by Dr. Orton, of Minneapolis. He was a member of the high school football team and on that day when "diving in" had sustained an upward dislocation of the outer end of the right clavicle. The diagnosis was self-evident.

By laying him on his back upon a hard table so that the scapula was tilted outward and backward the dislocation could be readily reduced. An attempt was made for three days to hold the bone in place by means of adhesive straps and bandages, but every time he returned to my office it was found out of place. It seemed wrong that this young man, who took special pride in his physical development, should be condemned to permanent deformity and partial disability, so an operation was advised, which he promptly accepted.

On September 20, at the Northwestern Hospital, an incision about four inches long was made around the outer end and upper posterior border of the clavicle, extending down through the soft parts to the bone. Although there was no abrasion or discoloration of the skin it was very evident that the dislocation had very nearly been compound, for the outer three-fourths of the clavicle was completely separated from the soft parts. The coraco-clavicular ligaments were completely torn across. The acromic-clavicular ligaments were left attached to the scapula, leaving the end of the clavicle quite bare. A finger could be passed underneath the clavicle almost to the sternum without meeting with any obstruction. It was now very easy to understand why the clavicle would not remain in its place when it seemingly had been reduced. The fact is that it had never been reduced and it was necessary to cut the superior acromio-clavicular ligament quite extensively before the reduction could be made.

When reduction was supposed to have been accomplished before the operation it is evident that the acromio-clavicular ligaments had been pushed down by the clavicle so that nothing remained above to hold the bone in place but the skin and superficial fascia. This explains our failure in treating these cases by ordinary means. One can understand that in a case where the injury was not so severe as in this case the clavicle might not be lifted above the acromio-clavicular ligament and might be completely reduced with a hope of retaining it there, but it is very evident that after a complete dislocation complete reduction and retention are impossible save through an open wound. The separation of the bone from its surrounding soft parts was so complete in this case as to seemingly endanger its vitality.

Three holes were drilled through the upper margin of

the outer end of the clavicle and corresponding ones through the acromion process. The bone was then placed in its normal position and held there by silver sutures passed through these holes. The superior acromio-clavicular ligament was replaced and the ends united by catgut sutures. The superficial fascia and integument were united by catgut and silk respectively, and a surgical dressing applied. As an extra precaution the patient was kept in bed and on his back for three weeks. At the end of five weeks the wire sutures, which were necessarily quite superficial, were showing through the skin and were removed. One week later the condition of the shoulder was perfect, as shown in the second photograph, and it has remained so ever since.

One of the theoretical objections to wiring in these cases that has doubtless arisen in the mind of every surgeon who has ever contemplated the operation, is that this being a moving point the wires must sooner or later be a source of irritation, and it seems to be well founded. Should I ever again have an opportunity to perforin this operation I shall use chromicized kangaroo tendon because it is strong, elastic, and sufficiently durable.

DISCUSSION.

DR. W. O. HENRY, of Omaha, Neb.: Mr. President—The only criticism I have to make in connection with this case is that the essayist should have given us a skiagraph before and after treatment. It is a little difficult to tell from the photograph just exactly what condition he has there. I was deeply impressed with this fact recently in having a case of fracture of the upper end of the humerus, in which, after attempts at readjustment of the fracture, a skiagraph showed displacement. If the essayist had given us skiagraphs before and after, his work would be more definite and clear, and would show what the result is. As to the material used in suturing, I think kangaroo tendon would be preferable to the use of silver wire.

DR. GEORGE HALLEY, of Kansas City, Mo.: I think this paper is exceedingly opportune, for at the present time we are beginning to think about operative procedures in treating fractures and dislocations in localities where it seems

almost impossible to get good results without manipulation of the fragments of bone that have been displaced or broken. I have never had anything to do with dislocation of the scapular end of the clavicle, but I have in two instances had to do with dislocations of the sternal end of the clavicle. It is a notorious fact that it is impossible to hold the parts in place by any ordinary means that have been adopted. I think all text-books on surgery will bear me out in this, that after dislocation it is utterly impossible to hold the ends of the bone in place. You can reduce the dislocation, think it is all right, but you find, after you put bandages and dressings on as you please, compresses, and anything else, you will not hold the arm in position very long, and your patient will either become restless under the appliance, or the retentive apparatus will prove so inefficient that you will find a displacement the next day when you come to see the patient. I have treated one such case with such unsatisfactory results, that I concluded the next time I had to do with a similar case I would adopt some other means, consequently it being so superficial I concluded to make an incision in the case and find out what the trouble was. I found that the lower end of the clavicle, which has quite a prong when you attempt to dissect the ligaments apart in the skeleton, was broken off, and I take it, in a large proportion of cases in which sternal dislocation occurs, that this is the case. Dr. Moore said that in his case the ligament was turned down, and in my case when I put on extension and pressed it back, this ligamentous fold torn off would slip underneath it and acted as an impediment to the complete reduction of the dislocation. Like Dr. Moore, I used chromicized catgut in suturing the ligament, pulling it up to its place, and did not have any difficulty in reducing it or in suturing in the last two cases. In my last two cases the tear was extensive. I obtained good results in both cases. After pulling the part in position, suturing it, and applying an ordinary dressing, it is an easy matter to hold the fragments in place. I find a simple support of the elbow, as in an ordinary case of fracture of the clavicle, answers every purpose, and I succeeded very well by this method where I failed entirely before.

Dr. F. A. Dunsmoor, of Minneapolis, Minn.: There was one point brought out in this paper to which I desire to refer, and that is with reference to the suture material that was used. My experience has not been favorable with regard to the use of kangaroo tendon in such positions. In like positions, as in suspension of the uterus, hernia work, etc., I will say that I have been more disappointed with the kangaroo tendon suture than with any other material I have ever used.

Dr. D. S. Fairchild, of Clinton, Ia.: About three years ago I had a case similar to the one Dr. Moore has reported. I treated it in the same way, using silver wire. I had to use some sort of non-absorbable suture material on account of the fear that it would not hold in view of the motion which must necessarily occur in that part of the body. The suture remained buried for two years, and then came away.

Dr. H. P. Hamilton, of Omaha, Neb.: I was very much

pleased with the general outline of the paper; but, it occurs to me, he struck the keynote when he said that when these dislocations cannot be reduced or the parts replaced in perfect position, they should be cut down on, and the obstruction removed. When we remember the conditions that exist in a joint, when we are not able to replace it, we can readily see why that should be, because it is always the case in any dislocation, wherever it may be found in the body, that when the part cannot be replaced, the ligament that holds the joint in position is to blame. In the case the essayist mentioned it was evidently the ligament that was producing the deformity and preventing replacement of the parts. When he cut down on the part, he was able to incise the ligament, place the part in proper position, and suture it there. It occurred to me, while he was reading the paper, that it would be hardly necessary to put in silver wire or any permanent ligatures to hold the parts in place; all that would be necessary would be simply to stitch the ligaments over the part to hold it in normal position, and by slight splints over the part prevent pressure or prevent reproduction of the dislocation for a few days only, when the part would be in perfect position. If we stitch the ligament over the joint, as soon as there is regeneration of this tissue, or a reproduction, or a building up of the ligament that normally holds the part in position, there is no reason why there should be replacement forward. We know about how long a time it takes for the reproduction of the ligament. Within eight or ten days there is no danger of separation, consequently I do not believe it is necessary to use silver wire in suturing these ligaments, or kangaroo tendon. In my opinion, catgut would be sufficiently strong to hold the parts in perfect apposition long enough to have reproduction of the tissue.

DR. MOORE (closing the discussion): With reference to the remarks of Dr. Henry regarding skiagraph before and after treatment, really I should not expect very much help from them in this case, for the reason that we were mostly interested in the soft parts. What I wish to call attention to is the fact that I found the soft parts in a condition which could not be demonstrated by any skiagraph that I know of. The wire suture is theoretically condemned by a great many. I made a practical demonstration; it is not a suitable suture material because it is so superficial. I removed it, and it did no harm. I had a little opening in this case that no surgeon likes to see. I have not been so unfortunate in the use of kangaroo tendon as has Dr. Dunsmoor. I have buried it everywhere in the tissues in different parts of the body, and have never had any trouble with it.

As to the remarks of Dr. Hamilton, it is possible that the bone in my case, which is one of a class of cases we all meet with, could have been held in place satisfactorily by means of chromicized catgut, because is was the acromioclavicular ligament which was down underneath the clavicle that caused the mischief. As soon as it was restored to its natural position, the tendency to displacement was slight. The use of catgut sutures, with the patient kept three weeks in bed, which is time well spent, would secure the end that we all desire.

Dr. Halley's experience with reference to the treatment of dislocation of the sternal end of the clavicle simply bears out my own. I believe it is the proper treatment for dislocation of the sternal end of the clavicle, as well as the upper end, and the prime object of the operation should be to get the ligaments that were naturally in front restored to their proper place and to hold them there.

ETIOLOGICAL FACTORS IN PRODUCTION OF TUMORS.

By GEORGE HALLEY, M. D.,
KANSAS CITY, MO.

The origin of the term "tumor" goes back to the infancy of our medical knowledge, and simply means a raised or elevated part of the body, unnatural, and only found in morbid conditions. The early concept was that something had raised or enlarged the part—it was hoven up. Scientific investigation has been even enlarging the scope of our knowledge along the lines of etiology; hence, we find that tumors were very early divided into benign and malignant. Those that killed by some inherent qualities in the tumor itself, destroying the natural tissues of the body wherever they came in relation with them, and during the time of their growth diminishing the organic qualities of the blood and other tissues, were termed malignant; while the benign growths do not kill, except in a mechanical way interfering with the functions of life. They do nothing in the way of altering the quality of the blood, and except for their mechanical relationship, in no way alter the nutritive processes, any more than the other tissues of the body do. Indeed, they in every way comport themselves along the lines of normal vitality. On either side of this broad line of demarcation are found the two great groups of morbid growths; the one receiving the general term of benign, and the other malignant tumor. What the cause was that produced these

morbid manifestations has been the field of study and investigation of all modern pathologists, and various theories have, from time to time, been propounded and investigated, most of them being now consigned to oblivion. No theory has been broad enough to account for all the phenomena, either in the benign or the malignant groups. Inflammatory conditions that almost invariably produce some kind of tumefacation were for a long time regarded as the principal factor in their production. Many things, however, in the inflammatory condition, in no way comported with the ordinary processes found in tumor growths; and products of most of the tumor growths were utterly unlike those of the inflammatory process. But as inflammation was believed to be principally due to irritation, it was, and even by many pathologists is still, held to be the prime factor in the production of morbid growths.

The study of bacteriology has demonstrated beyond a question of doubt that the inflammatory condition, while due to irritation, is yet due, generally, to a specific form of irritation; that is, bacterial life. It is but a short time since tuberculosis was believed to be due to a form of inflammation. We now know well that, while inflammatory conditions obtain along with it, it yet is all due to bacteria,—a bacterium, too, that exercises a specific influence in the life of the whole organism. Actinomycosis was, until recently, believed to be due to injury-traumatism of some kind. Now we have been able to demonstrate its etiological factor to be the ray-fungus. Syphilis was believed to be some kind of a poison infection; but what that infection consisted of was a question to which no one attempted giving an answer, until later bacteriological investigation demonstrated it to be a germ. That tumors often grew as the result of injuries and inflammatory conditions was a well established fact, and while they were

not like any of the ordinary products of inflammation, it was supposed that irritation or the inflammatory process was in some way so altered or modified as to give rise to this morbid entity.

Cohnheim came to the rescue of the pathologists with a most specious theory and attempted to account for, not only the malignant growths, but as well the benign; the theory being that embryonic rests, or fragments of embryonic tissue, that had been misplaced, or not used in development process, were now found growing as the result of some irritation, perhaps an injury or an inflammatory process. This theory, while exceedingly plausible, and demonstrably true in certain classes of growths, did not satisfy a very large number of pathological investigators, and they have looked, and are still looking, for causative agencies that will better account for tumor growths. The weak point in Cohnheim's theory was, that if it accounted for one class of tumors in a satisfactory manner, it surely could not account for another class that was entirely different, not only in their growth, but also in their pathological manifestations. Thus, the teratomata follow the laws not only of growth but of development. For instance, the supernumerary finger or toe is so much like the normal finger or toe that it is a difficult matter for the physician or surgeon to determine which is the real and which is the supernumerary. It has in it all the normal elements that are found in the digit of normal development,—bone, muscle, tendon, connective tissue, connective tissue of the palmar-fascia type, skin with all its appendages, nail, etc., showing the complete development processes that have gone on in this supernumerary fragment of embryonic tissue. The hand, or arm, or any other growth, implanted in the back, the chest, abdomen, or elsewhere, gives manifestation in the same way to an active development process

having taken place in it. It is tissue in common with, and as well developed usually as that found in the structure it represents. It became differentiated, just as any other embryonic tissue did, and after dropping its embryonic character went on to develop exactly as other tissues. It has no functional activity, and in this line it comports with ordinary tumors, excepting for this, a tumor is entirely distinct and unlike it in every way.

The carcinoma, sarcoma, fibroma and lipoma grow, but do not develop. The fibroma is like ordinary fibrous tissue. The lipoma differs little, if at all, from ordinary adipose tissue. The epithelial cell in the carcinoma is like the epithelial cell anywhere else; indeed, it is the principal means by which we differentiate the carcinoma from other tumors. The sarcoma has still its connective tissue cell, and only grows a connective tissue cell. It is an already differentiated tissue. It never steps beyond the boundary of that tissue. That there is a cause for this difference is beyond question. What is it? The little ova are made up entirely of undifferentiated cells. They grow up to certain definite sizes and number, but never change their form, or character, or functional activity, until they are infected by the sperm cell. How this infection takes place is impossible for us, so far, to demonstrate. The sperm cell attacks the germinal spot and is soon lost. It has, however, done something, through its activity on the germinal spot, to every cell in the ovum. It has determined a new activity and a new phase of life. A greater and greater activity manifests itself now, and at once we have development as well as growth.

In the malignant growth of epithelial origin there has been observed, and carefully studied, minute organisms that are known as coccidia, and by many pathologists they are believed in some way to be the

etiological factor in the production of cancer. How do they act, if they are? They live in the cell. They are never active until they find a new actively growing epithelial element. As soon as they are found in the epithelial cells, the cell begins a new activity. It grows with enormous rapidity, a rapidity that is unwarranted and impossible in any of the localities where it is normally found. It also lives in localities where it would previously have ceased to exist. It is, however, nothing more than an epithelial cell. It infiltrates connective tissue, blood-vessels, muscle, nerve, bone, or anything else; but it is always an epithelial cell. Is it not a proper conclusion to draw from the presence of the coccidium in the cell, that in some way this foreign organism has been the cause of this new departure in the life method of the epithelium? It no longer grows on the surface and adheres to it. It sheds off at first, but finally burrows into the deeper tissues and, indeed, this is one of the early manifestations of the infection. It may be asked, if this is a new infection in the sense of the ovular infection by the spermatozoa, why does not a development process supervene? To that I would answer, that it is a protozoon and has no potential qualities other than are found in the protozoa. The epithelium, too, being a fully-developed tissue, has within it no potential qualities for development. Hence we have a simple cellular life without development. The same principle is involved in the infection of the connective tissue cells in the sarcoma. It is probable that we will find a difference in the infecting organism in the different varieties of carcinoma and sarcoma, that the small round-cell sarcoma has a different infecting agent from that of either the giant-cell or the spindle-cell sarcoma; and that the character of the infecting agent determines the difference in form of these

growths. The later history of the tumor is due to its following the same law that we suggested in connection with the epithelial tissue. These agents, then, determine a new and rapid growth that carry with them none of the potentialities for development. They belong to the protozoon group and carry with them nothing higher than the protozoon potentialities. This will explain, I think, in a very reasonable manner why these growths contain products inimical to the life of the whole organism. They produce by their growth substances that are entirely foreign to any of the tissues or organisms. The organism, in its normal condition, is a complete and well-balanced machine, each part not only depending on the other parts, but on the proper functional activity of the other parts. The law enunciated by Treviranis (that, in respect to its nutrition, every organ and tissue in the body is to every other organ and tissue in the body an excretion) being conceded true, this foreign engraftment is at once entirely out of harmony with all and every process of life, and so antagonizes them that we have the condition established that we term cachexia.

Benign Tumors.—With reference to benign tumors, no well established theory has yet been found. We know that they exist, and that in their existence and life they do not, except in a mechanical way, materially interfere with the functional life of the organism. They have no products that destroy blood or produce toxines that are detrimental to the life process in any way. This would seem to indicate that we must look within the organism for the deviation from its normal type of growth and not from infection without; that the agency or agencies at work producing benign tumors are products of the tissue themselves. Every growth is dependent for its beginning to a precedent life process. The growth of cells or living germs, anywhere,

everywhere, is the result of a precedent living cell. These benign growths are not the result of infections by cell life from without, for if they were, they would establish a heterologous process in the tissues, and would produce toxines that would be destructive to the ordinary tissues of the body as they probably do in tuberculosis. The etiological factors of their production must, therefore, be looked for within the organism itself.

In examining the beginnings of many of these growths we trace them back to more or less severe injuries, injuries that would better perhaps be characterized by the term "irritation," than injury. It is not such a condition as would result in an inflammatory irritation—not such a condition as would be produced by a bacterial infection, and yet, not a physiological action such as is carried on by the vital functions of the tissues. It is less than the former. It is more than the latter. We have here a gap where we have cell action seriously interfered with, but not destroyed. No sooner, however, do we interfere with physiological cell life anywhere than we interfere with physiological cell reproduction. We have not exudate nor karyokinesis as in severe injury, nor destruction of tissue, else we would have scar tissue. We have, however, forces at work that modify the physiological changes. There are changes not only in the well-formed cell, but there are also changes in the cells, spores, and nucleus. It may be of such a character as will give the reproduction of a tissue closely resembling that from which it is produced; but without its physiological process it is entirely incapable of performing its life activities. It had a bad start in life, and throughout its life continues to go wrong.

One constantly occurring element in all benign tumors is the connective tissue. Sometimes it predom-

inates and sometimes is in abeyance. Its presence, however, is never wanting. Of all the tissues in the body it most readily responds in physiological activity to irritating processes. In inflammatory changes we find it, practically speaking, the reconstructing agent. It is not wonderful, therefore, that we have the essential part, if not the entire mass composed of this tissue. Is the connective tissue germ cell altered in quality? Has it been inoculated by a plastic material altered in quality by an irritant, or has there been a coalescence of protoplasmic germs from other tissues? We have not yet determined this, but I take it that along these lines, if not exactly, yet relatively near to it, will be found the true etiology of the benign tumor.

The purpose of this paper is to elicit discussion of a subject that is of the most profound importance to medical science. We must determine, if possible in the near future, the etiology of these morbid growths, in order to prevent or successfully treat them. If I have in any way helped to this most desired end, I shall be more than satisfied with my work.

A CONSIDERATION OF THE DIFFERENT SURGICAL PROCEDURES IN THE REMOVAL OF FIBROMYOMA OF THE UTERUS.

By JOSEPH EASTMAN, M. D.,

INDIANAPOLIS, IND.

For the purpose of disarming criticism, I wish to say that I did not select this title as the subject of my paper. If I had had that privilege, I perhaps would have selected a more live topic, because the subject of the removal of fibromyoma of the uterus has been satisfactorily settled for a number of years; that is, if we take into consideration the basic fact, that the morphology of the tumor, and the environments of the

patient are to be considered before we select the method we wish to pursue in removing the tumor. In preparing a paper some time ago a gentleman discovered that twenty-five hundred papers have been written on appendicitis, showing that that subject has been engaging the attention of the profession within recent years more than the one we are to consider today. It seems like threshing over old straw to discuss this subject. However, it is a remarkable coincidence that the year 1844 was the beginning of so much that is valuable in surgery. It was a period when anesthesia became of practical use to the surgical profession. Clay, of Manchester, in 1844, operated, for the first time, for the removal of the myomatous uterus, so far as we have any record, and his operation was almost a complete or so-called panhysterectomy, in that he removed a large portion of the cervix. Bardenheuer, in 1881, made a complete total extirpation of the uterus through the abdomen. Freund, of Strasburg, in 1878, removed cancerous uteri through the abdomen, not enlarged uteri on account of the presence of fibroid tumors. In this country Kimball made probably the first operation, so far as we have any record, for a fibroid tumor. In spite of these operations, we will find that the success following the removal of fibroid tumors by any or all methods advanced with that of abdominal surgery in every direction, until success is now almost as great as the removal of ovarian cysts. Kimball, of Lowell, Massachusetts, made nine hysterectomies, with three recoveries. Dr. Irish, Brennan's assistant, made sixteen hysterectomies, with four recoveries. They were not doing any better surgical work in the old country. Gusserow collected for Koeberle some statistics, and up to 1866 he had lost all but eight out of forty-two hysterectomies. In 1881 Schroeder collected a report

of 108 cases, with a mortality of 85 per cent. Kimball, in 1877, in the American Medical Association, stated that the fatality was horrible, but was much worse than had been reported, because many of the operations undertaken were followed by death of the patients, and no reports were made. He and Brennan, who were early operators in this work, gave it up and adopted Cutter's electrical treatment. They abandoned abdominal hysterectomy. At about the same time Keith, of Edinburgh, as you are well aware, abandoned hysterectomy and wished he had the patients back from whom he had removed fibroid tumors, that he might cure them by electricity. Keith abandoned the removal of fibroid tumors by operation, although his success had been better than this horrible mortality which I have just quoted. Trenholme, of Montreal, was among the earlier operators in doing hysterectomy. Taking advantage of Battey's operation, in 1881, he reported fifty oophorectomies for the control of hemorrhages following large fibroid tumors, with good results. Hegar and Tait began this work about that time, removing the ovaries, and bringing on the menopause for the purpose of producing a shrinkage of the fibroid tumors, with satisfactory results. The work has been taken up all along the line in all departments of abdominal surgery. Some nineteen or twenty years ago, when I was teaching anatomy for eight years, and was assistant to Professor Parvin, then of Indianapolis, I recall a woman who consulted him for a fibroid tumor as large as that spittoon (pointing to spittoon nearly as large as one's head). He went carefully into the technique of differential diagnosis and explained why it was that so large an ovarian cyst could be successfully removed, but as it was a fibroid tumor, the mortality was so high it was criminal to attempt its re-

moval. She consulted a Doctor Harvey, and the result was the same. She then went to that distinguished pioneer in ovariotomy, Dr. Dunlap, of Springfield, Ohio. He answered in the same way. He explained to her how solid the tumor was apparently, and that it was not an ovarian cyst, and that therefore the woman was compelled to go home and die without an attempt being made to remove this tumor. On her way home she received a jolt in the sleeping-car which forcibly pressed the tumor against the promontory of the sacrum, shortly after which she died. Post-mortem examination showed a gangrenous spot, with a pedicle not larger than my thumb, showing that the tumor could have been removed very easily.

The change in the fatality following the removal of fibroid tumors has been due to many things. First of all, and most important of all, is that more men have become masters of aseptic surgery. Secondly, to improvements in technique in the removal of large tumors; a wise discrimination on the part of the operator as to the best method to be adopted in a given case governed by the morphology of the tumor and the environments of the patient; a better understanding of the anatomical conditions by which these tumors are developed, and which must necessarily enter into consideration in their removal.

In 1890 I had the pleasure of riding on the car with Bantock from London to Birmingham, to attend a meeting of the British Medical Association. I had then removed ten fibroid tumors of the uterus, with one death. I was full of boyish glee over the results that I had obtained, because I had read of statistics which were not any better than my own, and I thought I was doing something in the right direction. Dr. Bantock said to me, "What do you hope to accomplish by the method you speak of in removing these tumors?"

I replied that I hoped to perfect some method so that we could say to a patient, who was previously doomed to die, that we can remove this tumor or tumors with the same low mortality which we now have following the removal of ovarian cysts. He said to me, "Doctor, I would remind you that the anatomical conditions are so different that that can never be accomplished." I doubt if there is a gentleman within the sound of my voice, or in any place in the United States or in the world, who is familiar with this subject, who will deny that we can remove these tumors with the same low mortality that we have following the removal of ovarian cysts.

Not with a view of establishing any priority, or any claims of my own, for I care nothing about that, but after having given some of the points in the evolution of abdominal hysterectomy, I will read some clippings from medical journals.

My first operation was done February 3, 1887. The abdomen was opened by an incision two inches in length, and I plunged a trocar into the tumor. No fluid escaped, but a red blush spread over the surface, characterizing a tapped fibroid. The incision was enlarged, extending to the umbilicus, the tumor turned forward and out of the abdomen; the broad ligaments were clamped, ligated with cobbler's stitch, and separated with the cautery; the pedicle clamped with my large temporary clamp. At that time, even, I had in my mind a peculiar clamp which would safely and thoroughly seize the broad ligament and hold it firmly, so that I would have no anxiety about it afterwards until I was ready to ligate it. A strong elastic ligature was then thrown around the pedicle as low as the vaginal attachment, and then it was severed between the clamp and ligature. A conical-shaped piece of tissue was cut out of the stump, the apex pointing toward

the internal os, the base directed upward and outward toward the serous membrane. A cautery iron at blue heat was three times passed through the cervical canal from above downward, for the purpose of destroying the mucous membrane and also to assist in drainage from the interior of the stump. A dressing forceps was passed through after the cautery, by the aid of which a rubber tube, as large as my little finger, was dragged up to within a half inch of the free peritoneal surface. I expected this tube, by its expansion, to resist shrinkage of the stump. After I passed the tube up through the cervix, I had no constrictive material of the stump or neck of the uterus which I had severed.

One of the most approved methods of the day is the ligation of the uterine arteries, leaving the uterine tissues without constriction. The elastic ligature was removed. After ligating the uterine arteries, the flaps were brought together by Lembert sutures, it requiring some twelve of them. The peritoneal cavity was cleansed, glass drainage tube, going down into Douglas' cul-de-sac, was introduced, and the abdominal wound closed with silk sutures.

I have taken pains to quote from my first case, because, perhaps, dispensing with the drainage tube, it is the operation, above all others, which I would use for general purposes to-day. There is no constriction of the stump. The uterine arteries are ligated separately; I either cauterize the uterine canal, or whip it over, leaving it without cauterization, as may be desired. A step in advance in the technique of removing fibromyoma by abdominal hysterectomy is the panhysterectomy, and was made in New York city first by a woman (Mary Dixon Jones), in 1888. There has been some discussion as to whether this was a complete and well planned abdominal hysterectomy or not.

I will read from her own description, and you can decide whether it was an abdominal hysterectomy, or whether it was an abdomino-vaginal hysterectomy, or catch as catch can and get out as best you can with the operation, after you have once begun it.

"She was admitted into the Woman's Hospital of Brooklyn, February 5, 1888. Operation performed February 16. As she lay on the operating table under ether, the body seemed a mere skeleton; the monstrously large and nodulated tumor filled the whole abdominal cavity, extending up to and under the ribs. A small exploratory incision was made first midway between the umbilicus and down to the pubes. I passed my hand in and around to free adhesions; then, by means of Tait's screw, with the left hand beneath, the mass was lifted out of the abdominal cavity. The right tube was greatly enlarged, presented the appearance of a coiled up and adherent mass of intestine; the left tube was also adherent, its fimbriated extremity closed and the tube filled with pus. The broad ligaments were tied off, and the temporary rope clamp thrown around the tumor, a great portion of which was cut away; then Koeberle's clamp was screwed on, lower down, when other portions of the fibroid were enucleated. The pedicle thus secured, consisted of a mass of tumors, one of them three inches in diameter, all closely packed, reaching to the cervix. I knew that to make a pedicle of this mass would not only endanger the patient's life, but render the operation unfinished and imperfect, so I decided at once to proceed as in kolpo-hysterectomy for the removal of this portion. Dr. Charles N. D. Jones took charge of the abdominal wound, temporarily closed and covered with aseptic gauze, and greatly assisted me by forcibly pushing down the cervix with the contained tumors. I rapidly separated the vaginal attachments, carefully preserv-

ing the bladder and ureters intact. Still the large size of the tumor would not allow the cervix to come down sufficiently to secure the broad ligaments, so after clamping as much of the broad ligaments as possible, from the vaginal opening, I passed a pair of forceps through the vagina and requested Dr. Jones to assist in guiding the blades so that they would fully clamp the broad ligaments. The mass of tumors, on account of their size, had finally to be delivered through the abdominal opening. The handles of the large forceps which clamped the broad ligaments were left projecting from the vagina, the peritoneal cavity was washed out, the abdominal wound closed and dressed, the vaginal wound left open for drainage, and treated as in vaginal hysterectomy."

This operation is cited as the first abdominal panhysterectomy where the cervix, entire tumor, and uterus have been removed. Less than a year later, without knowing who had done that, or how it had been done, I reported the following case, in September, 1888:

"Case 122.—Mrs. P., referred by Dr. Chavis. From experience in Case 119, I determined to leave no pedicle to become gangrenous, to slough, to bleed, and to furnish septic material to contaminate the peritoneal cavity. Having cut and tied my way up around the cervix in thirteen extirpations of the uterus for cancer, I was confident I could find my way from above downwards, avoiding ureters and bladder. The cervix has been removed a few times in New York, but no hysterectomy staff has been used, so far as I know. Where, as in this case, the woman is very fat, and has a deep pelvis, the work would be very difficult, if not dangerous, without the staff. In this case it became evident that fixing the pedicle in the lower angle of the wound was not advisable. I used a Simon's re-

tractor to lift the cervix, by elevating the floor of Douglas' cul-de-sac. From my familiarity with the parts, gained in the cancer operations, I found little difficulty in removing the cervix entire; then, bringing ligatures down through the wound into vagina, I had complete capillary drainage. I also added a rubber drainage tube to make sure of a good outflow of all fluid used in washing the peritoneal cavity. This patient made so good a record that I was induced to still further perfect the method by having a hysterectomy staff made, which I have used since in these cases.

"The staff is passed up the vagina by an assistant, and carried behind the cervix; then by depressing the handle, the grooved end is made to lift the floor of Douglas' cul-de-sac well up towards the abdominal wound. A clip with sharp-pointed scissors finds the groove. The operator then inserts his finger and begins to stitch and cut around the cervix, avoiding ureters and bladder. I also use this staff to open the cul-de-sac for the insertion of the drainage tube, where vaginal drainage is preferred."

Before I made the next operation, I had this instrument constructed. (Exhibiting instrument.) Now, there is a little bit of history connected with this that may interest you.

On my way to the International Medical Congress, in 1890, Dr. Edebohls and Dr. Krug, of New York, sailed on the same ship. I was delighted to invite them to my room, and show my method of hysterectomy. At the International Medical Congress I demonstrated the use of this hysterectomy staff, and the method which I have described, believing at that time it was the operation par excellence.

At the time I demonstrated my method to the Section of the International Medical Congress, I made

August Martin a present of my staff. In 1892 Chrobak, professor in the University of Vienna, wrote an able paper, in which he described his method of total or panhysterectomy, by which he used a staff, described also by Dr. Zinkie, of Cincinnati, in a letter on his return from the Continent. It may be said, that Chrobak was not attending the meeting of the International Medical Congress, and had no knowledge of it. But in the interest of American surgery, I wish to say that I have here a copy of the Memorabelien Zeitschrift Rationale Pracktische Aertze, of 1889, containing a complete translation of my paper, and a picture of the staff well set forth, and it is barely possible he saw that, if not probable. I know a number of gentlemen who have seen him use the staff with great dexterity, and who believed that he was the originator of the operation. So far as that is concerned, we were antedated long before that by Bardenheuer.

It seems that whatever use Chrobak may have made of the operation, on both sides of the Atlantic members of the profession seem to give honor to whom honor is due. Dr. Ross, of Toronto, Canada, says: "Dr. Eastman, of Indianapolis, was the only operator on this continent who had previous to that date performed the operation of total extirpation of the uterus for the removal of a large fibroid tumor by this or similar methods."

Knowsley Thornton says: "Bardenheuer and Eastman deserve the chief credit for the operation of complete extirpation." In another article Knowsley Thornton says: "Chrobak, a close follower of Eastman, has been most successful with his cases of complete extirpation."

I have mentioned the different steps and different technique of the operations for the removal of fibroid tumors of the uterus. So many new things and new

methods are becoming old, that it is well that some of the old methods should become new. Bantock, Keith, and Joseph Price, and many others, followed the technique of making a beautiful little pedicle out of the neck of the tumor—a cuff, as it were, which they could constrict not larger than the little finger, and fix the same in the lower angle of the wound, and their results had been, up to the time of certain developments, as good or better than their best. A great mistake has been made in connection with that operation. In the haste of operating, time and again, a mass larger than my fist has been constricted by the wire or rope, or something of that kind to the pedicle. A gentleman said to Dr. Price, "I can't make a pedicle out of those large-necked tumors as you do." His reply was, "Damn it, you don't know how." Leaving out the profanity, there is a great big truth in that statement. The operation has been condemned time and again for the reason which he described. These gentlemen developed an operative technique by which they could enucleate the mass or masses low down, and make a pedicle not bigger than one's thumb, which they could fix in the lower angle of the wound.

A number of different methods for performing hysterectomy were developed, because operators said that they had infection about the abdominal wound by the use of the serre-nœud. I claim, that the man who would have infection about the serre-nœud, where the pedicle is fixed in the lower angle of the wound, is not a master of aseptic surgery, and he ought to take an additional course of training to enable him to do aseptic surgery, because he has no more excuse for having infection occurring at that point than he would have at any other point within or outside of the abdomen. The operation has many things to recommend it, one of the most important being that the wounds in the

pelvis and in the abdominal wall are united, and welded in one, so that there is only one wound to heal, and not two. Second, there is less handling within the peritoneal cavity; less dealing with the broad ligaments, and less probability of infecting the pelvis by operation, which enables you to work largely outside of the abdomen, and not by dealing with the coils of intestines which are coming down into the pelvis if you do not use the Trendelenburg position. Furthermore, the contact of air is deleterious when that position is used, because we expose the parts to air for some length of time. Again, it is very essential in many instances to make a ventro-fixation in order to give the woman a strong pelvis. I have repeatedly seen and heard of women, who have had their ovaries removed, complain of an everlasting bearing-down and dragging sensation for which the uterus was fixed by a ventro-fixation in the abdominal wound. These things of themselves are sufficient to recommend the old operation. In some cases, not all, I think the old operation should become new; it should become new for a new operator, until he has mastered the technique so that he can have a pedicle without any pus around his serre-nœud. He need not use the serre-nœud. My friend, Dr. Oviatt, reminded me of a case which was operated by the method of our distinguished countryman, Dr. Senn, who brings the tissue up, making a little narrow cuff, fixing it in the lower angle of the wound, so that the pedicle is not larger than one's finger. There was no serre-nœud; nothing within the peritoneal cavity; no raw surface to become infected.

In these days of so many ventro-fixations and ventro-suspensions for the relief of the dragging sensation, not caused by the weight of the womb many times, this operation has the advantage that it fixes the tissues of the pelvis, and prevents prolapse and

dragging sensations, and in laboring women it makes them much more comfortable.

With reference to the complete or total abdominal hysterectomy, so-called panhysterectomy, where the cervix is removed, that is an operation which must be selected in quite a number of cases. For example, a woman, with a large fibroid of the uterus, may have an old lacerated cervix, with evidence possibly or probably of a cancerous condition. There is a case where a complete panhysterectomy is the thing to do. In a case where cancer has already involved the cervix, with a fibroid tumor above, it is well to consider this operation. With the smallest amount of interference with the broad ligaments, the patient will have more strength in the pelvis, and the larger the amount of interference with the broad ligaments, as in panhysterectomy, we go down and extirpate the cervix, we weaken the structures, and impair the function of the bladder. Now, the operation I made in 1887 and have selected in a large number of cases, has that one objection in particular, that there is no support to the little piece of uterus that is left. The vagina is necessarily shortened; the broad ligaments are necessarily very materially destroyed. If I were asked to make an abdominal hysterectomy, I should want to know the morphology of the tumor before determining the method to be pursued. If I were to go into the abdomen with a cut and dried method, on every occasion, I should expect to come out frequently with a funeral. Each and every patient, as well as the nature of the tumor, must govern the method of procedure to be undertaken. I am in the habit of first clamping the broad ligaments as high up as possible, then severing them. I apply this forceps (indicating) on either side, slitting down the broad ligament, splitting it off from the side of the tumor as well as I can conveniently,

then, not before, do I ligate the uterine artery. I slip the broad ligament down; I take hold of the uterine artery and can ligate it more closely than otherwise. The flap is made anterior and posterior to the cervix. The same procedure is carried out on the opposite side. The cervix may be covered by serous membrane, or left uncovered, as the case may justify. Some operators maintain that in panhysterectomy drainage is much better. I know of good operators who have changed from one method to another. For instance, Dr. Hall, of Cincinnati, is advocating complete or total extirpation, claiming that vaginal drainage is more efficient. I think it is objectionable to open up a sewer like the vagina in connection with abdominal work where the same can be avoided. Where we tap the vagina to drain the peritoneal cavity, I am afterwards afraid I will get infection from the tube, no matter how thorough my sterilization may have been. I have been astonished to see the number of small fibroids as large as my fist that could be removed by myomectomy, and yet the uterus would repair itself and become a fair-looking organ afterwards. If by that means we can retain all the sexual functions of the woman, we should practice that method. Women are beginning to consider the question of destroying the entire sexual impulse by hysterectomies and oophorectomies. The genito-urinary surgeons do anything and everything under heaven before they think of removing a man's testicles, but I am afraid gynecologists have erred a little on the other side in going to extremes and have unhesitatingly removed many, many ovaries and uteri that could have been preserved. Think of the neurotic wrecks which we see following hysterectomy and oophorectomy—women who have become unhappy because their entire sexual impulse has been destroyed, and they have reason to feel so. Where

it can be performed, myomectomy should be done, saving as much of the uterus as possible, and suprapubic or abdominal hysterectomy, where it must be done, saving the cervix, saving one ovary, and even saving the other ovary where it is possible—in short, we should remove nothing except that which we are compelled to remove to save life and to restore health to the patient.

I owe the society an apology for rehashing so much of this subject, but I thank you for your attention.

MYOMECTOMY: ITS PLACE IN THE TREATMENT OF FIBROMYOMA OF THE UTERUS.

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The term "myomectomy" is used to designate the removal of a tumor or tumors from the uterus, and the conservation of that organ. The operation is strictly along the lines of conservatism and can only appeal to those who recognize the fact that it is the sexual system of woman that is largely responsible for her individuality as different from the sterner sex—man. Her disposition, likes, dislikes, and frequently her mental equilibrium are dependent upon the possession of healthy functionating sexual organs, and her connubial life, to be satisfactory to herself and her husband, is largely likewise dependent. Hence, to preserve the uterus and its appendages is one of the chief aims of gynecology.

The operation of myomectomy is not applicable to all cases of fibromyomata of the uterus, but only to well-selected cases. This operation does not supplant

panhysterectomy, hysteromyomectomy and the different procedures for the relief of fibromyomata, but takes its place as one of the recognized rational procedures, and as it is a highly conservative measure, it should be the favorite procedure when possible. A critical bimanual examination through the vagina and rectum under complete anesthesia will usually admit of the diagnosis of cases amenable to this operation. All of the different varieties of fibromyomata, viz., the subperitoneal, the interstitial, and the submucous, may be treated by this method. By many operators it has been limited to the pedunculated subperitoneal variety; however, it has now been successfully applied to every variety of fibromyomata with satisfactory results as to the immediate mortality rate and permanency of cure. In the submucous variety it is probably applicable to nearly every case, and is vastly more surgical and scientific than morcellement practiced through the dilated cervix. The technique in the performance of myomectomy in large submucous fibroids need not differ so very materially from Cæsarean section. The Trendelenburg position and a free abdominal incision are advisable. The uterus should be delivered through the abdominal incision, and the peritoneal cavity protected with gauze. As a precautionary measure against hemorrhage, a rubber ligature may be tightened around the supravaginal portion of the cervix. A longitudinal incision is now made in the fundus, its location and length depending somewhat upon the size and location of the tumor. Strong vulsellum forceps are fastened in the tumor and by pulling and snipping with scissors it can be quickly shelled out. The hemorrhage, as a rule, is not profuse, and can easily be controlled by forci-pressure, the placing of ligatures, and by packing the interior of the uterus with iodoform gauze,

so placed as to be removable from the cervix through the vagina. The interior of the uterus may swabbed with the perchloride of iron, which constringes the open vessels and arrests oozing. The wound in the uterus should be closed with interrupted catgut sutures placed about one-sixth of an inch apart in tiers; through mucous coat, then muscular, and finally peritoneal coats.

In small tumors the vaginal route may be selected, the fundus can be delivered through an incision in the anterior vaginal vault, when the tumor or tumors may be dealt with the same as through an abdominal incision. Myomectomy is less applicable in the treatment of very large fibroids, for the reason that in many instances the nodules are so numerous and diffuse that the identity of the uterus is almost entirely lost.

Wm. Alexander, of London, England (Medical Press and Circular, April, 1898), reports a case in which he removed a fibroid from the uterus, by myomectomy, weighing twenty-one pounds. The uterus and adnexæ were conserved and the patient made a good recovery. All three varieties of fibromyomata may affect the uterus at the same time, so that in enucleating the interstitial and subperitoneal varieties, it is often necessary to make a deep incision in the fundus, and examine for a small submucous nodule. Of course, the presence of such a nodule can often be discovered by palpation, and it is only necessary to make an incision when in doubt, or when a submucous nodule is known to exist, and its removal is contemplated. The teaching has been that the mere presence of a fibromyoma of the uterus should not warrant surgical interference, but that there must be present as accompanying symptoms pain and hemorrhage, to demand operation. Such teaching

is not in accord with the present state of our knowledge of fibroid development and the pathological changes which take place in the tumor, uterus and ovaries, the chronic invalidism found existing in such patients, and the fatal termination sometimes due to such changes.

Prof. A. Martin, in an article published in 1890 in "Pathology and Therapeutics of the Diseases of Women," Boston, gives a report of 205 cases operated by himself with the following complications:

Fatty degeneration of tumor	7
Calcification of tumor	3
Suppuration of tumor	10
Oedema of tumor	11
Cystic degeneration of tumor	8
Telangiectasis of tumor	3
Sarcoma of tumor	6
Carcinoma of cervix uteri	2
Carcinoma of corpus uteri	7
Total	57

showing that over 27 per cent. of his cases had sufficient pathology in the tumor and uterus to have produced death.

Dr. Charles P. Noble, of Philadelphia, in the September, 1901, number of the American Journal of Obstetrics and Diseases of Women and Children, gives a report of 218 case of fibroid tumor of the uterus operated upon by himself, with the following table showing the complications which were met with:

Appendicitis	4
Bilateral hydrosalpinx	8
Unilateral hydrosalpinx	5
Hematosalpinx	1
Calcareous infiltration	5
Cystic degeneration of ovaries	2
Ovarian cyst with twisted pedicle	1

Ovarian cyst, bilateral	2
Ovarian cyst, unilateral	19
Ovarian cyst, suppurating	1
Bilateral dermoid cyst with umbilical hernia	1
Dermoid cyst, suppurating sinus through abdominal wall	1
Dermoid cyst with twisted pedicle	1
Intraligamentous development of fibroid	10
Retroversion of uterus	3
Procidentia of uterus	3
Parovarian cyst	2
Ectopic pregnancy	3
Papillary carcinoma of both ovaries	1
Abscess of ovary	1
Pyosalpinx, bilateral	5
Pyosalpinx, unilateral	3
Salpingitis, unilateral	5
Salpingitis, bilateral	2
Myxomatous degeneration of tumor	5
Cystic degeneration of tumor	5
Necrosis of tumor	12
Adenocarcinoma of body of uterus	3
Epithelioma of cervix uteri	4
Sarcoma	2
Syncytioma	1
Total	121

Thus this table shows that 121 of Noble's cases out of the 218 operated upon had associated pathology in the tumor, uterus, appendages, and appendix vermiformis.

He further states that 71 of his complicated cases would have led to a fatal result. Thus, it is clearly evident from a study of the tables given by Martin and Noble that fibromyomata of the uterus must not be considered a harmless affection, as has been heretofore taught, but that quite a large percentage of

cases will prove fatal if left alone (over 27 per cent. according to Martin's and over 35 per cent. according to Noble's table), besides the invalidism and suffering to be found among patients thus affected.

The mortality associated with hysterectomy, hysteromyomectomy and myomectomy for fibroids may be given at from 3 to 5 per cent. against probably 33⅓ per cent. of a mortality from a do-nothing treatment.

It is true that the above percentages are necessarily inaccurate for the following reasons: (1.) Operation in fibroids is so very frequently practiced as a last resort that the mortality rate would necessarily be high from the associated pathology and the general systemic condition of the patient. (2.) The number of operators reporting the associated pathology complicating their cases of uterine fibromyomata are so few that we can not have sufficient statistics at our command to give any degree of accuracy to the percentage of cases that would terminate fatally without operation.

I certainly believe that we are now fully justified in advising early operation, as against the do-nothing treatment of the past. When a fibroid is suspected, a painstaking examination should be made, if necessary under anesthesia, and if a suitable case for myomectomy, it should be the operation of selection.

If early operation was the common practice, a very much larger percentage of cases would be amenable to myomectomy. The older and larger the tumor, the more likely are we to encounter the different pathological changes that are in the tumor, uterus and appendages which render the operation of myomectomy impossible.

It would thus be inferred that this operation is more applicable to the treatment of small fibroids

that have not undergone pathological changes. I am of the opinion that a very large percentage of small fibroids are amenable to this operation. In large fibroids that are diffuse, the uterus is quite often contorted into a shapeless mass, so that were it possible to enucleate the different nodules, the remaining tissue would hardly be recognizable as the uterus.

The influence of the menopause upon fibroid development has been very much exaggerated, and while a very small percentage of cases may cease to give disturbance, a vastly larger number of cases will be unaffected. Indeed, the menopause will be prolonged or fail to be established, hemorrhage continuing. Fibroids usually affect women during active sexual life, and the attempted tiding over of such patients in anticipation of the menopause, with so little hope of benefit ensuing, is to be deprecated.

The dangers to be considered in the performance of myomectomy are hemorrhage and sepsis. The soft fibroid nodule is often quite vascular and may bleed freely when incised. I have not met with a single instance where I have failed to arrest hemorrhage by forci-pressure and the placing of ligatures, and have not had a secondary hemorrhage occur.

When several nodules are to be enucleated, it is advisable to promptly check hemorrhage, as the loss of blood incident upon the removal of a number of nodules would be a factor in the production of shock. After the enucleation of fibroid nodules, the abdomen should not be closed until oozing has entirely ceased.

Sepsis.—If rigid aseptic measures are carefully adhered to in each step of the operation, sepsis need not be feared. In submucous tumors which are necrotic and septic, a very careful technique must be followed.

The operative field should be protected with gauze pads carefully placed and the peritoneal cavity pro-

tected in the same way. The uterus and wound should be carefully cleansed and drainage through the cervix established.

ARGUMENTS IN FAVOR OF MYOMECTOMY.

1. In young women the conservation of the uterus and ovaries makes motherhood possible.

I have one case to report: Mrs. F., 31 years of age, married five years, and had never been pregnant. Began menstruating at 16 years of age; periods were regular and without pain; duration from three to five days. A negative history as regards tuberculosis or cancer. Had measles when 7 years of age, and typhoid fever at 20, otherwise a history of good health. She consulted me in November, 1898, complaining of weight and pain in the pelvis, prolonged menstrual period, with slightly excessive flow. She had never had a severe hemorrhage. She had a profuse leucorrhea; was anemic and complained of being weak and unable to perform her ordinary household duties. A bimanual examination revealed a retroverted uterus with a fibroid nodule as large as a hen's egg in the posterior wall; two smaller nodules were palpable higher on the fundus. Myomectomy was performed three days later through an abdominal incision. Five nodules of the interstitial variety were removed, when the uterus was carefully palpated and a small submucous nodule discovered and removed, making in all six nodules. Ventrosuspension was performed for the correction of the retrodisplacement. I was asked by the patient as to the likelihood of her becoming pregnant, and informed her that her chances were probably some better, as the uterus was now in better position. She consulted me again October, 1899, nearly a year after the date of the operation. She stated that she had missed her periods since the

19th of August, and that she believed she was pregnant. An examination verified the truth of her belief. She was delivered of a healthy female child the 22d of May, 1900. The mother and child were in good health two months ago.

2. The operation is reasonably safe and is applicable to quite a large percentage of cases, if performed early.

3. That very many women may be saved from years of suffering and yet retain their uterus and appendages.

4. That as fibromyomata of the uterus are now diagnosed much earlier than formerly, owing to the advancement in our science, a larger percentage of cases will be amenable to myomectomy.

CONCLUSIONS.

1. Myomectomy should be the preferred method in every case where possible to do so without extra risk to the patient, and where the ovaries can be conserved with the uterus. Operative interference should be advised in every case of fibromyomata where after a careful examination myomectomy is considered possible.

2. The operation of myomectomy is at all times as safe in cases where it is applicable, as hysteromyomectomy and panhysterectomy, and very many times almost a minor procedure practically free of risk.

3. The early diagnosis of fibromyomata should be insisted upon with a view to enlarging the percentage of cases in which myomectomy may be applicable.

100 State Street, Chicago.

MANAGEMENT OF UTERINE FIBROMYOMATA COMPLICATED BY PREGNANCY.

By MILES F. PORTER, M. D.,
FT. WAYNE, IND.

Fibroids very frequently interfere in no way either with pregnancy or labor, and on the other hand they often are the sole cause of sterility, and operations for their removal may be demanded for this cause alone. We are not, however, concerned in this paper, except with fibroids complicating pregnancy.

Operations on pregnant fibroid uteri may be demanded either in the interest of the mother or of the child, or of both. In some cases the size of the tumor alone threatens the premature expulsion of the fetus, and at the same time produces a great deal of discomfort through pressure. These conditions are much more likely to obtain in old primapara. The following illustrates this class of cases:

Mrs. B. at 35 was married in April and came to me the following July on the advice of her physician, Dr. Wilson, of Berne, Ind. She had not menstruated since her marriage. The abdomen was greatly distended and the patient was suffering much therefrom. An examination resulted in a diagnosis of fibroid complicated with pregnancy, and an operation was advised with a view to relieving the woman and saving the child. The operation was done in St. Joseph's Hospital, August 2, 1901. The tumor was attached by a broad pedicle to the left of the fundus, as shown in Figure I. An elastic ligature was thrown around the pedicle and the tumor cut off, after which the remaining fibroid tissue was shelled from the stump and the wound closed by deep and superficial catgut sutures. It was necessary to close a number of the punctures

made by the larger needle carrying the catgut, by fine silk sutures, on account of the hemorrhage. I never saw such an enormous number of monstrous thin-walled veins in a belly in my life as was present in this case. The operation was, however, extremely

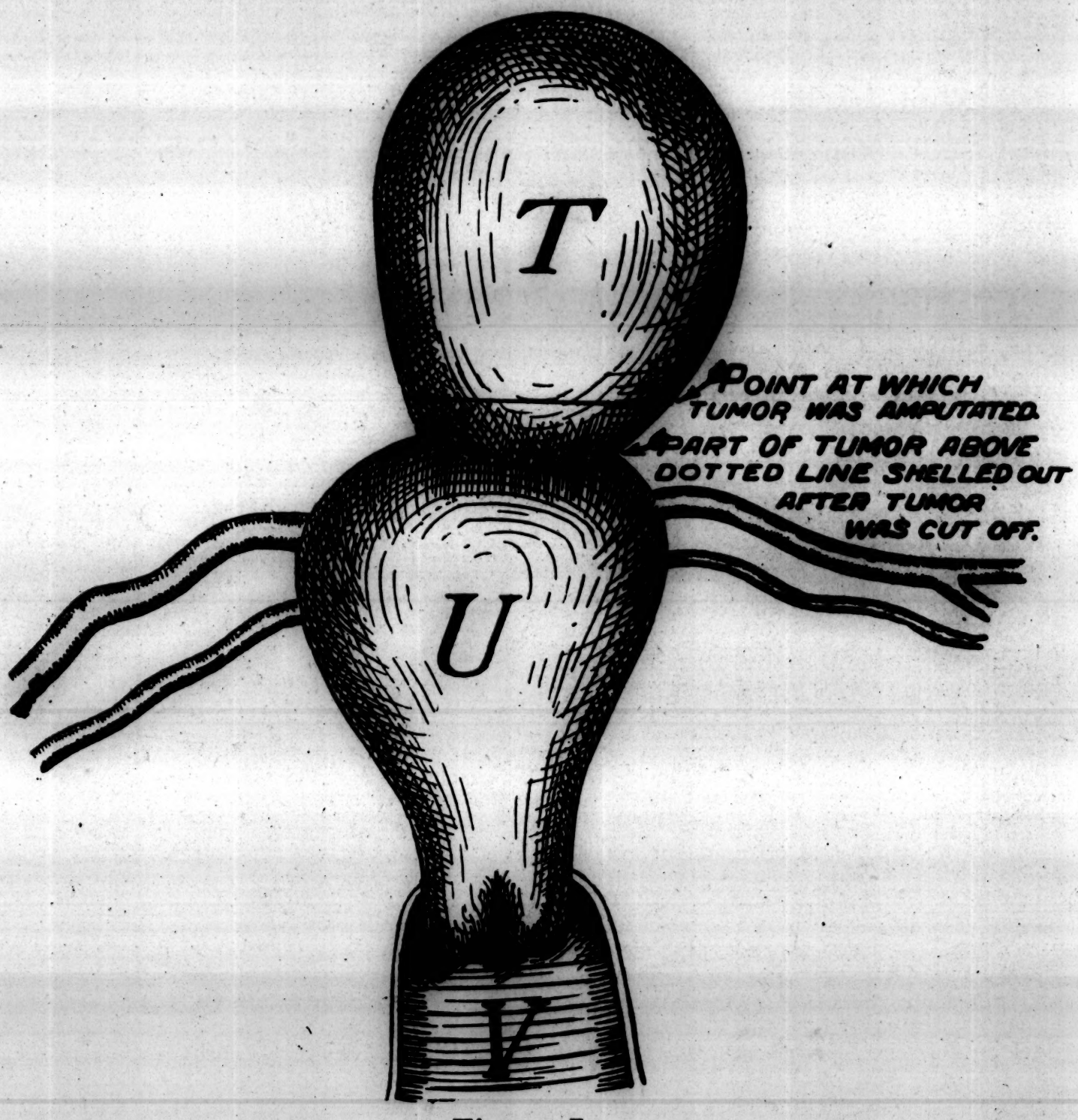

Figure I.

simple, and the recovery uninterrupted, save that for two or three days there were some pretty sharp uterine contractions, which were controlled by morphine given hypodermatically. The specimen which I here show you (Fig. II) measures seven and three-fourths

The cuts for this article were kindly furnished us by the Annals of Gynecology and Pediatry, Boston.

inches in the greatest diameter and weighs eight and three-fourths pounds. The woman is in good health, and expects to be confined next January. What I feared most in this case was that uterine contractions would come on before the uterine wound had healed, and that rupture of the uterus would occur. I shall

Figure II.

not feel quite secure on this score until I learn that she has been safely delivered.

I can find no accident of this kind recorded, but Homans, of Boston, speaks[1] of this accident occurring in the hands of a physician who had produced labor prematurely because of the presence of a fibroid, and Watkins[2] reports a case of ruptured uterus, the result of a myomatous condition, the woman dying suddenly.

Fibroids may be so situated as to interfere with de-

livery by preventing dilation of the cervix, or they may take up so much room in the pelvis that they prevent the passage of the child, without, however, interfering with the development of the fetus. In the majority of cases belonging to this class it will be better to avoid operative interference until labor comes on, then remove the tumor or tumors per vaginam or abdomen as the case may require. It is true as Homans[3] says, that nature will sometimes lift these tumors out of the way and allow labor to proceed when such a happy outcome seems almost impossible to the accoucheur; but in view of the fact that nature has shown herself to be a "poor surgeon," albeit a "good physician," I do not think one would be warranted in waiting long for nature to accomplish this result. Certainly operative interference should be resorted to before the woman is exhausted, and in preference to severe and protracted manual efforts to lift the growth out of the way or to dilate a cervix whose dilation is prevented by the presence of a fibroid. Early operative interference in these cases reduces the risk to both mother and child. Death of the child from delayed labor, maternal sepsis, and rupture of the uterus, are the dangers incurred by delay, which may be avoided by timely interference.

Pedunculated fibroids of the cervix which hang into the vagina should be removed as soon as discovered, inasmuch as their removal is attended by less risk to both mother and child, than is their retention.

Fibroids which produce pressure upon the uterus or bladder may produce death of both mother and child from pyelonephritis. A case of this kind has been reported by C. C. Lee, of New York.[4] This result is particularly to be feared in fibroids wedged in the

pelvis, and should be anticipated by such operative interference as the individual case demands.

Another reason for removing fibroids either during pregnancy or immediately after the completion of labor is, that if allowed to remain, they are apt to become gangrenous and produce death from sepsis. This is more likely to occur in submucous tumors, but has been known to occur in the subperitoneal variety also.[5] Mann[6] emphasizes the danger from this source in a paper read by him before the Medical Society of the state of New York in 1896. Rossenwasser,[7] Crofford,[8] Longyear,[9] and others have shown that sepsis is much to be feared after labor in these cases. Fatal hemorrhage following delivery is also not uncommon.

In view of these facts, Cæsarean section, followed by a hysterectomy or a myomectomy at the commencement of labor, should be the treatment of choice in some cases, even though the tumors offer no serious mechanical obstacle to the delivery of the child. My position is that very many cases of both baby and tumor which may be delivered by the natural route were better delivered through the abdomen. Susserat, quoted by Bishop[10] puts the maternal mortality at 53 per cent. and the infantile mortality at 66 per cent. in cases delivered by the natural route. Tarnier[11] lost two-thirds of both mothers and children in six cases delivered by forceps, and had five women die before delivery. Phillips[13] puts the mortality after version at 55.5 per cent. and after forceps at from 22.2 to 66.6 per cent. There can be no question but that this is a very much higher mortality than would follow timely delivery through the abdomen with removal of the tumor. Even granting that the death-rate above given may be reduced, as claimed by Rossenwasser,[12]

to 37 per cent., my position here taken still holds good, for surely no operator would to-day be satisfied with a 37 per cent. mortality rate in the operation here advised. Besides, after delivery per vaginam, the woman still has her fibroid with its attendant dangers. Walls[14] has known a uterine fibroma to produce inversion of the uterus immediately after delivery, and advises immediate removal of the tumor either by myomectomy or hysterectomy under these circumstances.

Fibroids may be so located in pregnant uteri as to prevent the necessary growth of the uterus, thus rendering it impossible for the woman to carry the child to term. The following is the history of a case in point:

The patient was referred to me by Dr. John Sellers, of Montpelier, Ind. She had never before been pregnant, was 32 years of age, and had been married one year. She had missed three menstrual periods. The doctor was consulted on account of pain in the pelvis, and vomiting. After examination, a diagnosis of fibroids complicated with pregnancy was made, and an abdominal hysterectomy advised. She was removed to Hope Hospital and the operation was done September 6th, 1901. The recovery was without incident, and the patient is now enjoying better health than she has had for years. I reasoned that she could not carry the child to term; that the production of an abortion would entail more risk to life than a hysterectomy; that granting that she would recover from an abortion she would still have her fibroids. An examination of the specimen herewith presented (Fig. III) will prove my reasoning correct I think. The largest tumor, *a*, was developed in the left broad ligament and had to be shelled out before the mass could be lifted from the

pelvis. At *b* the gestation sac is shown through an incision made after the operation was completed. An examination of the specimen shows under what unfavorable circumstances pregnancy may occur, and

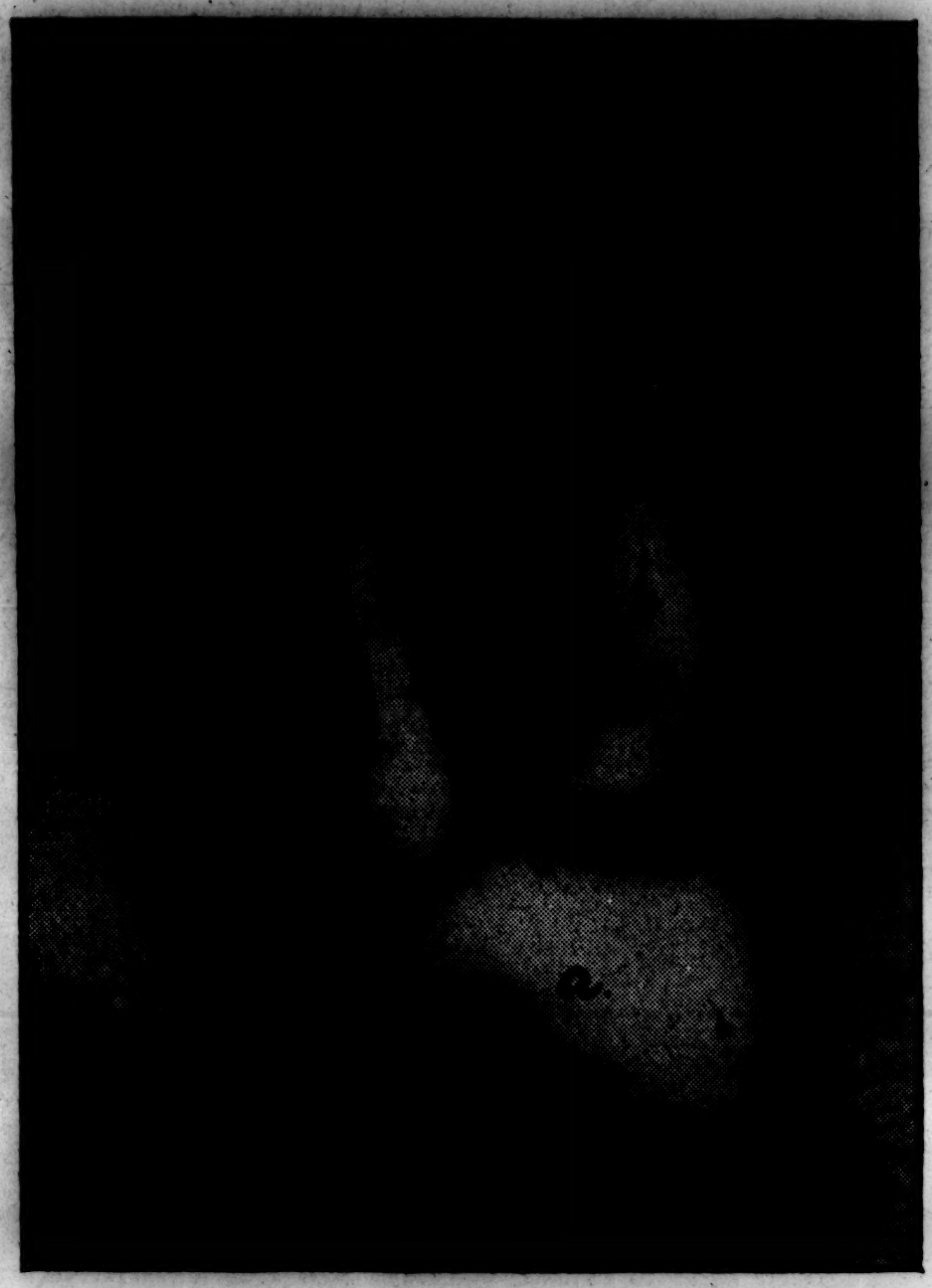

Figure III.

emphasizes the element of danger added to uterine fibroids by pregnancy.

Is the production of abortion ever warranted in fibroids of the uterus complicated by pregnancy? For myself, I have no hesitancy in answering this question in the negative. If one concludes that in a given case the child can be carried to term, but cannot be delivered by the natural route, then he should advise that

the operation necessary for the removal of the tumor and the delivery of the child be done at the completion of gestation. This course gives the mother as good a chance for her life as would the production of abortion, and makes it possible to save the life of the child. If the completion of gestation is regarded as impossible in the presence of the tumor, and the child may be carried until the period of viability is reached, no operative interference should be undertaken until this period is reached, when a myomectomy may be done or a Cæsarean section with hysterectomy. Other things being equal the former operation should be chosen, inasmuch as it preserves to the mother the possibility of further offspring, together with that of carrying the existing pregnancy to full term. Cæsarean section without removal of the tumor is perhaps not a justifiable operation.

I will conclude with the following summary:

1. Pregnancy is a frequent and serious complication of uterine myofibromata.

2. If, because of their size or location, they are likely to interfere with gestation or jeopardize the patient's life, they should be removed.

3. Each case is a law unto itself, and should be treated accordingly.

4. The tumor, and not the pregnancy, is the disease; and, therefore, any procedure which results in leaving the tumor and removing the pregnancy is unjustifiable. This, of course, is not meant to apply to those cases in which the fibroids do not interfere in any way either with gestation or labor.

5. Pregnancy does not materially add to the risk of operations for uterine fibroid, so far as the mother is concerned.

6. The life of the mother, the life of the child, and the question of future offspring are, in the order mentioned, the most important matters to be taken into consideration in coming to a conclusion as to the treatment of a case of uterine fibroids complicated with pregnancy.

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[8] Loc. cit.
[9] Loc. cit.
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[13] Annual Univ. Med. Sci., 1890, Vol. II.
[14] Progressive Med., 1901, Sept., p. 361.

TREATMENT OF FIBROIDS OF THE UTERUS BY ELECTRICITY—THE PRESENT STATUS.

By FRANKLIN H. MARTIN, M. D.,
CHICAGO, ILL.

Apparent consistency would stop all progress. In the light of our knowledge there was a time when the galvanic treatment of fibroids of the uterus by experts was legitimately the most conservative treatment we possessed for a majority of these troublesome neoplasms. Now, with the light of our achievements, I believe that the removal of fibroids with the knife, by experts, is the most conservative treatment we possess for the majority of these difficulties.

There was a time when I submitted practically all my fibroid cases to the Apostoli treatment, because the treatment scarcely ever failed to materially benefit the cases; it symptomatically cured quite a large percentage, and occasionally the tumor seemed to disappear.

It accomplished these results without submitting the patient to a procedure which possessed any legitimate mortality. It accomplished this result, too, in my hands, and I believe in the hands of all scientific administrators of the remedy, without running the risk of leaving the patient in a worse condition, in any given case, if the remedy did not actually benefit. The alternative of this remedy, too, at this early time, viz., surgery, was altogether too hazardous to tempt me from my safe if not entirely effectual remedy.

Gradually the evolution of the surgery for fibroids has reversed the relative position of these remedies. I consider vaginal and abdominal hysterectomies and myomectomies for fibroids, giving rise to serious symptoms, with their legitimate mortality reduced to 1 and 2 per cent., as remedies more conservative in their results than the treatment of these same tumors by electricity. I believe this, because hysterectomies and myomectomies with a small percentage of risk are the only remedies which absolutely relieve the difficulties in all cases. Electricity relieves frequently, symptomatically cures, but seldom actually removes the tumor, and the treatment is tedious to the patient and occupies much time of the physician in administering it.

With a mortality of 10 to 25 per cent. for hysterectomies for fibroids in the hands of the average abdominal surgeon, as it was fifteen years ago, I should advise electricity administered by one qualified to administer the remedy, as a routine treatment for the majority of fibroids. And when such conditions did so exist, I did so advise with all my might. With a mortality of 1 and 2 per cent. for hysterectomies for fibroids in the hands of the average surgeon, as I believe it is or should be to-day, I most emphatically,

with all my might, advise hysterectomy, or possibly myomectomy, as the routine treatment for the majority of fibroids of the uterus.

The present status of the electrical treatment of fibroids of the uterus is, therefore, in my opinion, that it has been properly superseded by surgery as a conservative remedy. I now recommend its employment in the following cases only:

1. As a local and general tonic, and as a relief of pressure and reflex pains, and of hemorrhage in cases with complications contraindicating surgery.

2. In all interstitial fibroids where operative assistance is absolutely refused by the patient.

3. In tumors of small size, of the interstitial variety, in which hemorrhage is the principal symptom in women within one or two years of the menopause.

DISCUSSION.

DR. W. O. HENRY, of Omaha, Neb.: Mr. President—I have been much interested indeed in this series of papers. It seems to me, for the most part, the gentlemen have covered the ground assigned them very satisfactorily. It is not so long ago we were taught that the men who did surgery for fibroid tumors of the uterus were doing unjustifiable work, and several years after Apostoli brought out his method of treatment of fibroid tumors of the uterus by electricity a great many practitioners fitted up their offices with the appliances necessary to carry out his line of treatment. Three years ago Dr. Massey, of Philadelphia, stated publicly before the American Medical Association that the electrical treatment of uterine fibroids had entirely superseded the use of the knife. A number of men disputed his statement. The fact that such a statement should be made in a paper prepared so recently as three years ago, taking such radical ground, is significant. I think the medical journals and the recent discussions of the question have all tended to show that the electrical treatment of these tumors has been overdone, and is to-day largely relegated to the past. I think the position taken in regard to myomectomy is correct, that where the uterine wall can be saved, where there are no complications requiring the removal of the tubes and ovaries, where the growth does not involve the entire depth or thickness of the uterus, so that this organ may be left intact, myomectomy is the operation to perform.

I was very much pleased with the paper of Dr. Porter, as to what shall we do in cases of uterine fibroids complicated by pregnancy. Only a few weeks ago I was consulted by a gentleman whose wife became pregnant for the first time, and she also had a large uterine fibroid. He had consulted two or three other physicians, who had advised him to have an abortion produced. I saw him a little later, and gave him the opinion that Dr. Porter has expressed, and that an abortion was really a very serious thing, and was not justifiable, and that it was more serious than a proper operation. I believe that is the correct position to take to-day, and the best advice to give.

In the matter of panhysterectomy for uterine fibroids, in my own experience I object to panhysterectomy, as a rule. I believe it is better to save as much as possible of the cervix; you get a better vault to the vagina; you have a better support for the pelvic contents; the woman does not complain of a dragging down feeling; the vagina does not protude so readily from the orifice when the patient is on her feet if you have a good stump left in the roof. But if you have a uterine fibroid, I believe we ought, as a rule, with very few exceptions, to save the cervix in the vault of the vagina, and thus obtain a better result than we would if we were to do a panhysterectomy.

I did not quite understand from the remarks of Dr. Eastman whether he advocated occasionally doing the old operation by fastening the stump in the lower angle of the abdominal wound or not. If he did advocate doing that, I would differ from him. I do not think that is justifiable nowadays. The use of the serre-nœud is out of date. I hardly think a surgeon is justified in using it when there are other operations which give much better results, and are so much easier of performance. They do not leave any dragging in the abdominal wall, such as we have if we leave a stump. In brief, I regard the serre-nœud as entirely out of place, and sewing of the stump into the lower angle of the wound is unjustifiable at the present time.

DR. VAN BUREN KNOTT, of Sioux City, Ia.: Myomectomy, as a conservative procedure in the treatment of neoplasms of the uterus, needs no support. It is commonly accepted to-day as the method of election in those cases in which it is applicable.

One point occurred to me in connection with the reading of Dr. Campbell's paper; that is, in cases where the nodules are numerous, he mentioned the advisability of controlling hemorrhage as rapidly as possible by forced flexion. In such cases I have had my assistant compress the uterine arteries, as in doing a Cæsarean section, until the wound could be closed by sutures; in that way I have not been bothered by hemorrhage. I remember a case of myomectomy performed on a woman three months advanced in pregnancy. The woman went on to full term, and was delivered of a healthy male child.

DR. B. B. DAVIS, of Omaha, Neb.: I am very much inter-

ested in the paper of Dr. Porter as to what to do in cases of myoma complicating pregnancy. I think the answer to that question should be to remove the tumors before the woman becomes pregnant; but, of course, frequently these cases come into our hands with that complication, and I endorse practically all he has said in regard to this subject. With reference to producing abortion before delivering the tumor or tumors, I would vote with him every time. I had an experience of that kind a few years ago, in which another physician, who was called in consultation, thought that would be the best method. This was done, and we almost lost the woman from hemorrhage when the abortion was induced. We finally controlled the hemorrhage. I afterwards removed the myoma; she made a good recovery; at the same time, my hair became almost white in the course of a few days on account of the condition she was in.

I think the advice given by Dr. Campbell in cases of fibromyoma, when the diagnosis is made, is pretty nearly correct. I think we all concede that myomectomy is vastly superior to a hystero-myomectomy. I believe that if we could do these operations fairly early, in the majority of cases we would relieve the patient without necessarily removing the uterus. I have one case on record, from whom I removed several myomatous nodules. The patient had been married several years, but was never pregnant. About two years after the operation she was delivered of a healthy baby. It seems to me, considering that so many cases are now being recorded of this nature, that we have very positive indications for performing myomectomy. In all of these cases, when we do a hystero-myomectomy, if we can save one ovary it is best to do so.

DR. F. A. DUNSMOOR, of Minneapolis, Minn.; In regard to the first paper, I nave nothing to add in the way of etiology, except to suggest to the thinkers on this point that from 10 to 12 per cent. of all women in the world have fibroid tumors.

I was glad to hear the paper of Dr. Eastman, because in my early operative work I used to have a great deal of satisfaction when I made an operation and found men like Dr. Eastman, who had blazed the way, agreeing with me in regard to the type of operations that I had at that time performed. Relative to the different methods of procedure, as he has quoted Dr. Price, and one gentleman in the discussion made the statement that the use of the serre-nœud was being discarded, I will say that I believe no less an operator than Dr. Price still uses this method of making this operation. Regarding the combined method, since Dr. Eastman has quoted Dr. Price, I will say that relative to any work done through the vagina, Dr. Price once said that it was a "great place for recreation, but a poor place for business."

As to the paper of Dr. Porter, I have had eight cases in which pregnancy was complicated by fibroid tumors. I thoroughly agree with him that where the case is far enough

along we should try to save the child. In all of my cases the mothers were saved. But in the other cases where pregnancy had advanced between the third and fifth months a total hysterectomy was made and the life of the child had to be sacrificed. I agree with those physicians who believe that the operation to be made is a supravaginal amputation, and in those cases where there is a relaxed abdominal wall and fatty abdomen, with a tendency to prolapse of the tissue, I believe in doing a ventro-suspension, sewing the stump of the uterus to the anterior abdominal wall.

DR. C. H. MAYO, of Rochester, Minn.: The papers presented were most excellent. I was especially interested in that of Dr. Porter on fibromyoma complicating pregnancy. The time is rapidly passing when necessary operations upon pregnant women are so long delayed as to render them doubly unsafe. I wish in this connection to report a case of the removal of a degenerated pedunculated fibroid operated upon at five and one-half months of gestation. The tumor removed was adherent and larger than the pregnant uterus, and had caused considerable ascites. The child was born recently at full term, and without unusual difficulty.

DR. A. C. BERNAYS, of St. Louis, Mo.: I am very much in favor of myomectomy where it can be done, and I rise merely to put on record a point that I have not published as yet. This winter I had two cases of very large fibroids in which I found that myomectomy for the purpose of getting out the big tumor was an excellent method of enabling me easily to make a hysterectomy. I think I can recommend that procedure very strongly. In both of those cases, I don't believe I could have made hysterectomy unless I had previously made myomectomy of the very large tumor, so that I could then, after the large tumor was removed, compress the empty bag forming the outer layers of the uterus, and easily make amputation of the uterus. That is a point I want to put on record.

DR. CHARLES H. WALLACE, of St. Joseph, Mo.: I have been very much interested in the papers on this important subject, and I arise particularly to offer my mite of commendation to the excellent paper of Dr. Eastman. I think it is the Nestors in gynecology, like Dr. Eastman, Dr. Sims, and Dr. Thomas, of our country, who have paved the way for the advanced condition in which gynecological surgery is to-day. To such men we owe much for the advancement we have at present.

I was interested in the paper of Dr. Campbell. Myomectomies are of recent origin, and probably were first done by his preceptor, Dr. Martin; and even to a new operator they lessen mortality; they are much easier of performance in properly selected cases, and for that reason myomectomy is an operation, where the diagnosis can be made, that, if possible, should be performed instead of a hysterectomy. Of course, myomectomy of the pregnant uterus is comparatively easy, and we should follow the excellent advice given by Dr. Porter.

DR. J. N. WARREN, of Sioux City, Ia.: I want to make one statement in reference to myomectomy being a simple and easy operation to do, without any particular dangers associated with it. My experience is and has been that it is a formidable operation, always attended with a great deal of hemorrhage, unless you have the subserous variety, where you have a pedicle and can incise the serosa around it and simply peel it out; but in the majority of cases, where we have the combined condition of the interstitial and subserous varieties, and have to go through possibly the entire thickness of the uterine wall, then it is not a simple operative procedure, but one that requires not only great manual dexterity, but good judgment, to know exactly the limit of the myomatous mass that you have to remove. As you doubtless know, Professor Kelly recently has advised and does the operation of freely opening up the uterine cavity, which, when formerly done, was supposed to be a hazardous operation. In one case I opened up through the uterine cavity, after the manner advised by Kelly, but had a troublesome hemorrhage to deal with, which was finally controlled by compressing the ovarian artery. Owing to the inability to get down to the uterine artery, it is not an easy matter except one does it through a vaginal incision. As I have previously said, I regard it as a formidable operation, and one requiring much dexterity to do it.

DR. W. A. TICHENOR, of Chicago, Ill.: I rise to second the remarks of the last speaker. Myomectomy has been recommended by most of the gentlemen as a comparatively simple operation. If there are one or two small tumors close to the peritoneal surface, it is not difficult to shell them out; but if you have eight or nine tumors of a small size and undertake to remove them all from the surface of the uterus, you will get the uterus pretty well riddled with incisions to remove all of these tumors, and it is not a safer operation in my humble judgment than a hysterectomy. I merely rise to express the opinion that it is not a simple operation to remove a number of intramural fibroid tumors of the uterus. I have had a painful experience along that line recently.

DR. JAMES E. MOORE, of Minneapolis, Minn.: I wish to endorse the paper written by Dr. Campbell. It is in the right direction. I think we will all agree that what was conservatism a few years ago is no longer conservatism. Most men in this room will recall the statement from some physicians of a few years ago that we had no moral right to operate upon a woman simply because she had a fibroid tumor of the uterus, because the mortality attending the operation in those days was so large. There may have been some truth in that statement then, but I am satisfied that it is no longer correct. I have been doing hysterectomies for some time for fibroid tumors of the uterus, and some myomectomies. I had an idea that I could remove the uterus without any mortality; but within the last month I have had two patients die in one week, and I have changed

my view a little. It is true, those were extreme cases that had gone on for years, and the women should have been operated on years ago. To-day these patients come to us at an earlier date. I am impressed with the fact that what was conservatism at that time does not hold to-day, and I believe the ideas advanced by Dr. Campbell are those of progressive men of to-day. There is one point I wish he might have emphasized, and that is the possibility of doing myomectomy through the vagina. Within two or three weeks I had occasion to operate through Douglas' pouch for the removal of a tubal pregnancy before rupture, and incidentally removed two fibroids, one of which was situated in the anterior wall of the uterus well down toward the bladder, yet it was not a very difficult matter to remove it through the Douglas' pouch.

Just one point as bearing upon the paper of Dr. Porter, and that is, we will be called upon once in a while to give our opinion as to whether surgery can offer anything in an extreme case. I have in mind a case in which I was called in the country to see a woman who was trying to give birth to a four or five months' fetus, but could not because of the presence of fibroid tumors, which had caused numerous miscarriages before. To all appearances, the woman was septic. She had a high temperature and high pulse, and yet I gave her a chance by doing a complete hysterectomy, and she made a good recovery.

DR. DONALD MACRAE, JR., of Council Bluffs, Ia.: I wish to endorse the paper of Dr. Campbell. It is the sinew of conservatism. Conservatism, according to Webster's Dictionary, means "to maintain the whole." In order to maintain the whole, the time to do surgery is to do it promptly, and therefore Dr. Campbell's paper strikes the keynote. It is our business to find out and diagnose these cases as early as possible, and the minute a fibroid tumor is diagnosed, it seems to me myomectomy is indicated. When these cases come into the hands of surgeons later, it may be necessary to perform hysterectomy, which is justifiable, and it is simply a recourse we must fall back on.

DR. LEWIS SCHOOLER, of Des Moines, Ia.: The trend seems strongly in the direction of operating on uterine fibroids complicating pregnancy either by Dr. Campbell's method or somebody's method. There is hardly a man in this audience who does not know of some fibroid tumors that have existed for fifteen years without creating any disturbance. I do not know that Dr. Campbell said he would remove them as soon as they were diagnosed, but some of the gentlemen in discussing the papers advocated operating as soon as the tumors were discovered. There are some women who have passed the menopause, others who are near it, and still others who will never have an opportunity to give birth to children in whom these fibroids are causing absolutely no trouble. I believe the old cases that are not giving any trouble should be let alone.

DR. HALLEY (closing the discussion on his part): My paper

was not discussed, consequently I have not very much to say other than what was contained in it. It is a paper for study rather than for impromptu discussion in a meeting of this kind.

DR. EASTMAN (closing the discussion on his part): Perhaps I might take this opportunity to discuss the other papers a little that were read in connection with my own, as I did not do so before.

With reference to the paper of Dr. Campbell, I have this to say: It requires very wise discrimination in a given case, no matter where the tumor is situated in the uterus, as to whether it is a simple case for myomectomy or whether one had better resort to hysterectomy or let the case alone. I have had two experiences within a year, one where I believed I could make a myomectomy and save the uterus. I found, after cutting down on to the tumor, a gangrenous condition. I found a small fibroid which contained a pus cavity; I had infected the wound below, and I regretted that I did not make a hysterectomy in the beginning. So we must be sure of our ground, and we must be certain that no degenerative changes have taken place. In the second case I had a dozen fibroids to deal with involving the uterus to such an extent that the woman was an invalid. These tumors encroached upon the bladder. I enucleated the tumors very nicely by means of an anterior colpotomy. After working an hour and a half to control hemorrhage with hemostats and ligatures, I made vaginal hysterectomy and saved the life of the patient. The woman was 35 years of age, and had a strong desire to bear more children. These tumors seemed to present the condition of tubercles, some of them undergoing degenerative change, the nature of which I did not know.

With regard to the paper of Dr. Porter, of fibroids complicating pregnancy, I desire to say that at the Denver meeting of this Association I reported four cases of fibroid tumors that complicated pregnancy. I had two of the cases under my observation for a considerable length of time. In one of them, during pregnancy, the fibroid tumor had grown more than four times what it was before conception had taken place. The woman was in a hectic condition and a debilitated state; I was in the East at the time, and she would not have anyone else operate on her. Miscarriage came on, the fetus was expelled, and the tumor shrank to its original size, not larger than my fist, it being a broad sessile base tumor, and became comparatively harmless. She made a nice recovery. Two years later she became pregnant again; the tumor took on rapid growth, became five times as large as before conception took place. She had the same hectic condition that she had before; I made a hysterectomy, and showed the specimen at the Denver meeting. The other patient came from Newcastle, in our state. She was 45 years of age; had been married ten years; had not borne any children, and her husband was determined to have a living child. I put her in my private hospital and watched

her carefully to see if she could possibly be tided through and bear a healthy child. She said she would give up her life to have a healthy child. I got her through five months and a half, until she was within six weeks or so of term, when we expected to deliver; but we were compelled to make an abdominal section, and do a hysterectomy, removing the uterus, child and all. This tumor had grown five times more than it did before conception had taken place, and was crowding upon the diaphragm and respiration, interfering materially with breathing. On account of the rapid growth of the tumor it became necessary to do a complete operation. In this case, I feel quite certain that had the child been expelled by the vagina, the tumor would have shrunken down again.

I have very little to say in closing the discussion on my own paper. I would say, however, the use of forceps to control the broad ligaments, to get them as narrow as possible, in order to reach the base of the tumor, is equally applicable to all methods of removing the cervix or leaving it as any method of suprapubic hysterectomy or panhysterectomy which the operator may adopt.

One of the gentlemen (Dr. Henry) did not quite understand me as to whether I yet found cases where I used the serre-nœud. After eighteen years' experience with different methods in, at least, six hundred hysterectomies, I say most emphatically I do not propose to do a hysterectomy or any formidable operation in the class of cases under discussion without having, if possible, the serre-nœud in my tray. While I have laid it aside until it has become rusty, so to speak, yet I have seen occasions to go back to it. I have fought against its use; the fight has been distributed all over the country, but I am satisfied that to the serre-nœud is due the credit of reducing the percentage of fatalities. The percentage of fatalities was kept low by the use of the serre-nœud while operators were experimenting with and developing different methods. So men like Bantock, Price, and others, stuck to a thing that they used successfully and by which they saved lives. We will yet find tumors with which we have to deal where the serre-nœud is the thing to use.

One of the gentlemen spoke of leaving a portion of the cervix to stop that bearing-down sensation, that cystocele. Why not, at the same time, use the serre-nœud and fix it up in the abdominal wound for the purpose of overcoming that bearing-down sensation? There is another excuse for using it. The method I advocated is the one I spoke of having used in 1887.

DR. CAMPBELL (closing the discussion on his part): I wish to thank the gentlemen present for their kind consideration of my paper, and very few remarks are called for from me. I would remind the gentlemen who took the position in their remarks that myomectomy was a minor procedure, or it would seem that they inferred as much from my paper, the position I took was that myomectomy, hystero-myomectomy and panhysterectomy compared very well in regard

to operative procedure and mortality rate. I also stated emphatically that it might be considerable of a procedure, and it might be in other instances a trifling operation.

In regard to the control of the hemorrhage, when a man like my friend Dr. Eastman, who has had more experience than very many men in gynecology, tells us that he ran across a case in which it was extremely difficult to control hemorrhage, in other words, that he could not control it short of hysterectomy, I do not suppose it would do any good for any of us to try to control the hemorrhage in such a case. I desire to refer to this one point that I made, namely, that all cases of fibroid tumor of the uterus are not amenable to myomectomy. Furthermore, I took the position that there were soft fibroids that bled profusely, the hemorrhage having to be controlled by the use of forceps and the placing of ligatures.

I have wondered what has become of the electrical men. I very well remember that about six years ago the secretary of this association read a paper on the electrical treatment of fibroid tumors, and what he said then was sanctioned by several of the members who were present except myself. To-day we have had the honor of listening to a paper by request of a gentleman who has certainly been the father of the electrical treatment in the city of Chicago. I refer to Dr. Martin, and you will notice that the position he has taken to-day is the position that many physicians held six years ago in regard to conservative treatment of fibroids, namely, to operate and not to use electricity. The experience I have had with the electrical treatment of these tumors has been limited, but I have had a number of cases after the use of electricity, and in every instance I have found pathology produced by the use of electricity.

DR. PORTER (closing the discussion): I quite agree with what has been said by the majority of those who have taken part in the discussion regarding the intraperitoneal method of treating the stump. It is the preferable method; but notwithstanding the fact that I do treat the stump that way, having abandoned the other method and that I believe it to be the method of choice, as a rule, I am absolutely compelled to say that there is no operator living who can show as low a death-rate by the intraperitoneal method as the same class of operators can show by the extraperitoneal method. The intraperitoneal method itself has inherent with it a greater mortality than the extraperitoneal method. I will concur in what Dr. Eastman has said to the effect that perhaps there will be cases occurring and coming under the observation of all of us that had better be treated extraperitoneally. That is quite true, but I have not found cases of this kind for a long time. Unquestionably there is a greater inherent danger with the intraperitoneal than with the extraperitoneal method.

I was agreeably surprised that no one objected to my statement, that abortion as a method of treating fibroid tumors of the uterus complicated by pregnancy was unwar-

rantable. To my knowledge, there is not a standard text-book that does not recommend it as one of the methods of dealing with cases of pregnancy complicated by fibroid tumors. I am glad that the position I took was in harmony with the views of some of those who have discussed the subject.

I want to thank Dr. Martin for the paper he has read. We talk a great deal about experience, but we seem to forget that to say we have learned such and such things by experience is equivalent to saying we have profited by our mistakes. The thanks of the profession are due to Dr. Martin for having tried electricity faithfully and thoroughly, and after having found it wanting, for having had the courage to say so. He has rejected his child when he found it unworthy of his affection, and I want to thank him personally for having done so.

TWO CASES OF CYSTS OF THE BROAD LIGAMENT COMPLICATED WITH MYXOMA.

By EDWARD HORNIBROOK, M. D.,
CHEROKEE, IA.

I venture to bring these cases before the society, not because of any peculiarties in their surgical aspect, but because of the rarity of the pathological conditions. That two cases of so rare a disease should occur in the practice of one man, in the course of a few months, is to say the least unusual.

Stengel defines a myxoma as a tumor composed of connective tissue cells and an intercellular substance containing mucoid material in more or less abundance. Virchow says "it is an embryonic tissue which may be maintained as an independent tissue." Dr. Charles Carroll Lee explains their etiology in ovarian cystoma as follows: "Here mucous villi or vascular sprouts of the connective tissue of the inner layer of the cyst wall push forward the epithelium into the cyst cavity, forming papillæ—sometimes minute, slender filaments, sometimes thick masses which ramify in every direction, filling the cyst cavity. More rarely they per-

forate the main cyst-wall from the excessive pressure exerted from within and sprout into the abdominal cavity. Growths of this character seldom form adhesions to neighboring parts, which Waldeyer and Emmet attribute to the peculiar nature of their epithelium, made up of cylindrical cells; this possesses many of the qualities of mucous membrane so long as the tumor remains intact. Friction against the abdominal walls gradually destroys the epithelium, however, and then adhesions may occur as in ordinary tumors." To the naked eye they exactly resemble the hydatid mole of the placenta, with which most of us are familiar. Henry Trentham Butlin, F. R. C. S., speaks of the hydatid mole of the placenta as a "typical cystoid myxoma."

CASE I.—On the 29th of last March I was asked by Dr. McNabb, of Rock Rapids, to come the next day to perform an ovariotomy in a private house. On my suggesting that she be removed to a hospital he stated that she was too much exhausted to stand the fatigue of removal, and that her only chance was in immediate operation at her own residence. I consented to visit the patient and operate if the condition warranted interference. I found a woman about 42 years of age, pale, feeble, and emaciated, abdomen enormously distended, breathing with difficulty and evidently approaching the stage where surgery would be useless. Her surroundings were unfavorable and no trained nurse had been procured. The doctor had examined her urine and found it normal, but scanty, and had procured free movement of the bowels the previous day. After being urged by the patient and her friends I reluctantly consented to operate, after quoting the words of Dr. John Brown in "Rabb and his friends": "An

operation may kill her, an operation may cure her, it ought to be performed"—if the surroundings were favorable. Before commencing I injected three pints of normal salt solution beneath the breasts, and had a hypodermic of strychnia and morphia given. Found the whole abdomen filled with myxomatous cysts, varying in size from one to three inches in diameter. I peeled them rapidly from the abdominal wall, intestines and under surface of the liver. They were in contact with all the abdominal viscera, the parietal peritoneum, and the wall of the main cyst, but not firmly adherent. No hemorrhage occurred in their removal. My assistants estimated that there were about three gallons of them. I then emptied the main cyst, which was large, multilocular, and the walls were thick and leathery. It grew from the broad ligament and, at the point ligated, the pedicle was at least five inches wide and nearly an inch in thickness. It was as firm as felt. I tied it in eight sections, and drew the peritoneum over the end of the stump with Lembert sutures. During this time the patient became pulseless frequently, but rallied by pouring salt solution at a temperature of 110° to 115° into the abdominal cavity. Gave a high enema of hot salt solution before she was removed from the table. Several hypodermics of strychnia had been given during the operation. She rallied rapidly, made an uninterrupted recovery, and was up and doing her house work in three weeks. I saw her in October last. She was in excellent health and had no appearance of recurrence, although at the Columbia Medical Laboratory, to which I had sent the specimen, they warned me that these growths very frequently recurred.

CASE II.—Mrs. D. D., aged about 38, consulted me

July 30, 1901, for gradually increasing size of abdomen. She was well nourished, not much debilitated, and only suffered from the abdominal distension. I diagnosed an ovarian cystoma, and advised its removal. Told her to bring me a specimen of urine for examination. She did not return and I heard nothing from her till August 20, when I was called by her family physician in consultation. He had diagnosed ascites and had twice introduced an aspirating needle, but obtained no fluid. I was then told that she had been, two weeks of the three which had intervened since I first saw her, under the treatment of an osteopath. She had increased rapidly in size, was very much reduced in strength, the breathing was short and rapid, and the stomach would retain very little food. I adhered to my first diagnosis of cystoma and, from the rapid growth, the peculiar character of the fluctuation and the fact that the aspiration had been negative in its results, I concluded that I had another case of myxoma, with, probably, rupture of the original cyst by the manipulations of the osteopath. Her attendant assured me that he had twice carefully examined the urine and found it free from albumin, although it was scanty. I again urged immediate operation, and she was removed to Dr. Wright's private hospital at Carroll. The doctor found the functions of the kidneys so impaired, with abundant albumin and tube-casts in the urine, that he delayed operation for a couple of weeks. He then made an exploratory incision and found such a mass in the abdomen, apparently adherent to the viscera, that he closed the wound and sent her home as soon as the incision had healed. They then again applied to me and implored me to give her the only chance an operation afforded. After

much misgiving I operated on September 20, assisted by Dr. Wright, of Carroll, and Dr. Cottam, of Rock Rapids. Dr. Biller gave the anesthetic. The abdomen was filled with myxoma and the original cyst, which I found grew from the broad ligament, was ruptured. The pedicle was about three inches in width but not very thick. I tied it in five sections. While I was tying the pedicle Drs. Wright and Cottam rapidly and carefully removed the myxomatous growths, so that by quick work we had the operation completed in less than fifty minutes. The normal salt solution was freely used both hypodermically and for washing out the cavity. She stood the operation well and reacted favorably. She passed a large quantity of urine within an hour. I neglected to say that both kidneys were felt to be greatly enlarged. After the first six hours she began to fail and died about twelve hours after the operation.

The inquiry naturally suggests itself, was not her death the result of the delay caused by her being placed under irrational treatment, and was not the extremely rapid growth the result of the rupture of the cyst? Whether this was done by osteopathic manipulations or not, I am not prepared to say; but I am firmly convinced that if the operation had been done soon after I was first consulted, the result would have been different. I append the report from the Columbia Medical Laboratory, of Chicago, which, although brief, lacking in scientific detail, and inaccurate in the statement that the original cyst was ovarian, and probably incorrect in stating that "some vessels were ruptured," and attributing the myxomatous growth to that cause, yet settles the question of its nature.

CHICAGO, Oct. 17, 1901.

Dr. E. Hornibrook, Cherokee, Ia.—Dear Doctor: We wish to report on specimen of tissue sent to laboratory October 15, 1901. Patient, Mrs. Dubes. This specimen was primarily a multilocular ovarian cyst. It has undergone myxomatous degeneration. Some vessels have ruptured and in consequence there has been an extensive myxoma peritonei. While these are not always malignant, they so tend in over 50 per cent. of the cases. Thanking you for the specimen, we are, very truly yours,

THE COLUMBUS MEDICAL LABORATORY.

SARCOMA OF THE UTERUS.

BY D. S FAIRCHILD, M. D.,
CLINTON, IA.,
PROFESSOR OF SURGERY, MEDICAL DEPARTMENT OF DRAKE UNIVERSITY, DES MOINES; SURGEON ST. JOSEPH'S HOSPITAL, CLINTON.

During the present year a lady 65 years of age came under my care presenting the following history and symptoms: The mother of several children, she had enjoyed good health until about two years ago, when she began to be troubled with constipation and pain in the lower part of abdomen and a sense of weight and pressure in the pelvis. These symptoms gradually increased. About six months prior to coming under my observation the symptoms became more acute, when she had, according to her statement, a discharge from the bowels. This gave her a measure of relief, but soon the same chronic condition she had previously suffered from appeared and continued on with some increase in severity until she came under my care in August of last year. A physical examination revealed the uterus to be uniformly enlarged to two or three times its normal size and appeared to be firmly impacted in the pelvis. There was no discharge from the

organ and the symptoms seemed to be largely due to pressure. The general condition of the patient appeared to be good, although she had lost in weight and was somewhat anemic. This could be accounted for, in part at least, on the ground of constipation and impaired digestion.

The age of the patient and the fact of the growth appearing after the menopause suggested malignancy, but the absence of positive symptoms of cancer indicated the probability of an enlarged and myomatous uterus. I opened the abdomen. The peritoneum was very much thickened, and there was found a considerable quantity of free fluid in the abdominal cavity. The abdominal wound was made sufficiently large to admit of a free examination of the uterus after the intestines were walled back by large abdominal pads. The bladder was normal in appearance. The uterus was uniformly enlarged, and occupied the usual position in the pelvis and reached upwards to a point corresponding to a uterus enlarged to the fourth month of pregnancy. The anterior surface of the uterus presented a grayish-white appearance, and fluctuated on palpation. The sigmoid was well crowded over to the left. The uterus was firmly adherent on its posterior surface. Masses of new growth extended out on either side to the ovaries and broad ligaments. It was at once apparent that we had to deal with a sarcomatous uterus and that any attempt to remove it would involve a dangerous hemorrhage, with small prospect of getting all the diseased tissue. I could not see my way clear to secure safe hemostasis on either side of the uterus, and having in mind the certain and speedy return of the disease in such cases, I determined not to expose the life of the patient in the useless attempt to

remove the organ. I opened the cyst on the anterior surface of the uterus just sufficient to explore the anterior. About one ounce of clear fluid escaped, revealing a very red and irregular surface. The thick cyst wall became flaccid when the fluid escaped, which enabled me to surround the three-quarter-inch incision with a purse-string suture, slightly inverting the edges, thus closing the opening completely. I now reinforced the purse string with a few additional sutures. Catgut was used in both instances. I folded over the sutured surface a strip of iodoform gauze, which I allowed to extend out of the lower angle of the wound, inserting a secondary suture to be tied when the gauze was removed on the sixth or eighth day; otherwise the wound was carefully closed. On the eighth day the gauze was removed, followed by the discharge of some serous fluid and the secondary suture tightened. The patient was discharged and sent home, a distance of 150 miles, in good condition at the end of the second week.

It was my impression that the less we disturbed the diseased organ the better it would be for the patient. I doubted the wisdom of opening the cyst, but the unusual appearance of the organ and the desire to discover the condition inside the cyst led me to do so.

My personal experience with diffuse sarcoma of the uterus is extremely limited, but the literature of the subject does not give much warrant for the operative procedures when the disease has advanced so far as to make the diagnosis easy before an operation is undertaken. In early cases, where scrapings have revealed the sarcomatous nature of the disease, better results may be expected, or in somewhat later cases, when the disease is clearly confined to the organ and the

tying off can be easily accomplished without leaving any part, an operation may be warranted. But when the disease has plainly spread out over the broad ligaments, even to a moderate extent, no good can be accomplished.

A recent examination shows that the growth has rapidly increased since the exploratory operation and her general health has correspondingly declined and the fatal termination is not far off. I realized the fact that a diagnosis as to the character of a morbid growth without a microscopic study lacks in scientific accuracy, but the clinical importance of arriving at a conclusion at the operating table was, in my judgment, of the utmost importance. If the disease was non-malignant, I ought to remove it; if malignant, I am very sure I would have shortened her life. I recalled the special features in the history of the case,—that a few months previous to the operation a quantity of fluid had escaped from her bowels, giving her for a time some relief. This was no doubt due to the emptying of a cyst lying in contact with the sigmoid. I took into account the general appearance of the mass, the free fluid in the abdominal cavity, the adhesions, and the extension of the growth on to broad ligaments. I had never before seen a cyst sarcoma of the uterus or a sarcoma which had undergone cystic degeneration. But I was so firmly impressed with the idea that I had one before me that I had no hesitation in acting on the theory that it would be much better for the patient to let it alone. What the antecedents of the growth were I do not know. But it is quite probable that a fibromyoma involving the fundus had existed for perhaps a long time which had more recently undergone cystic and sarcomatous degeneration. An important diagnostic

symptom was absent, namely, a uterine discharge; but it may be assumed that the endometrium and submucous tissues were not involved. However, there was no distinct tumor and the organ appeared to be uniformly enlarged, a condition which would seem to favor the probability of such a general involvement as to lead to hemorrhages. It may be observed that recently a moderate loss of blood has occurred on one or two occasions. Since the operation, and for some time before, she has suffered severe pain in the abdomen, had lost much in flesh, and has become very anemic.

The development of a diffuse sarcoma of the uterus after the menopause is much less frequent than carcinoma, but that it does occur late in life is well established, and it has particularly been observed to occur as the result of degenerative changes in fibromyomas, which have no doubt remained stationary for a long time. When these growths, which appear to give no serious trouble and make no advancement, begin to take on a new growth, attended with pain, loss of weight, and anemia, they may be looked upon with great suspicion if the change occurs after the menopause. This fact suggests the danger which may arise in allowing these apparently harmless uterine tumors to remain, and whether the risk of letting them alone is not greater than the risk of life in their removal. There can be no question on this point, if after 50 years of age a more or less rapid growth is discovered, but then it may be too late for the best results. Is it not true that any form of uterine growth is a menace to life at some time, even if it is apparently stationary?

DISCUSSION.

DR. GEORGE HALLEY, of Kansas City, Mo.: Mr. President—From careful observation of these myxomatous growths, I have long been inclined to classify them as malignant and

belonging to the sarcomata. I believe that a more careful analysis will place them in that group, and that they should be treated as sarcomata rather than as being growths. Not only that, when their contents are allowed to escape into the peritoneal cavity, or where nodular masses are left there, unless something is done to scrape them out or to get rid of them, they recur.

Another point in connection with the doctor's paper is the large flow of urine after the removal of the tumor, which might have been due to two causes: Either there had been pressure on the ureters, causing a dilatation of the pelvis of the kidney, interfering with its functional activity and practically destroying it when contracted down to its normal size, as it will do, or it may have been that there was active disease of the kidney going on before that. Perhaps the destructive changes going on in the tumor itself were an evidence of the condition that existed in the kidney from the infection. Early operation in those cases is indicated. One great mistake was made in the treatment of the case, namely, it was not operated on soon enough.

HEART SUTURE.

By MERRILL RICKETTS, M. D.,
CINCINNATI, OHIO.

Injuries and surgery of the heart have, until recently, been classed as anomalies. This one fact shows how little confidence there has been in successfully dealing with the heart surgically. At one time simple needle puncture of the heart was thought to always result in instant death. Experimental physiology and surgery shows what can be done and how to do it. It is the basis upon which heart surgery, especially, has been placed.

Twenty-five dogs were used in the experimentations. Penetrating and non-penetrating wounds of the heart were made and closed with sutures of different material. Interrupted silk sutures were found to be the best. No especial aseptic precautions were taken, as all pathologic conditions were desired.

The pericardium may be entirely removed without

death resulting. Either one of the coronary arteries may be ligated at its base without producing death. In a certain class of cases it is best to suture the pericardium to the chest wall that drainage may be perfect. It is ideal to suture during systole, but one will be satisfied to secure perfect suturing in systole or diastole. Even though the auricular is thinner than the ventricular wall, it may be sutured with equal success. Owing to this difference in thickness the per cent. of penetrating wounds of the auricles is much greater than those of the ventricles.

Knotting of the sutures should be firmly secured, otherwise they may become untied by the constant action of the heart. The sutures should pass through the bottom of the wound when non-penetrating, and through the endocardium when penetrating. If not in the latter, the wound may become enlarged from within. Sutures should not be made tight enough to cut the heart tissue.

The mortality is less in wounds of the right than those of the left auricle and ventricle. Bleeding is more severe in wounds from sharp instruments than when due to bullets.

CONCLUSIONS.

1. Injuries and diseases of the heart have resisted surgery longer than almost any of the tissues or organs of the human body.

2. They, however, no longer offer such resistance, but find themselves subject to attack by the same surgical principles as other parts of the body.

3. Experimental surgery teaches one to reason from animal to man.

4. Aneurism, foreign bodies, ossification, together

with abscess, syphilis, and gangrene, possess features which will have a great bearing upon, and will greatly influence, the future surgical work of the heart.

5. The application of surgical principles in certain cases of aneurism of the heart will, no doubt, be accomplished by suture electrolysis, or the injection of gelatine or something of a similar character.

6. The removal of a certain class of foreign bodies, whether they have formed within or have entered from without, should, and no doubt will, be accomplished.

7. That a cardiac abscess should be incised and drained, there can be no doubt.

8. Tumors of a pedunculated character on the external surface of the heart can and should be removed.

9. Pedunculated tumors with the cardiac chambers can also be successfully removed.

10. Parasitic cysts (animal or vegetable), when upon the external surface of the heart or in its wall, should be incised and drained.

11. Mitral stenosis, hypertrophy, and dilatation of the heart will sooner or later find complete or partial relief within the domain of surgery.

12. Injuries involving the myocardium are subject to the same surgical principles as injuries to other important organs of the human body.

13. Lacerated or incised, penetrating or non-penetrating wounds of the heart should be sutured.

14. Suturing or any other surgical procedure should not be discontinued because the heart should cease to pulsate. The work can and should be completed within a much shorter time on a quiescent heart.

15. All means should be resorted to, while the suturing of the myocardium is being completed, to re-establish the heart's action.

16. Drainage of the pericardial sac is necessary in many cases of injury of the heart.

17. Exploratory incision of the pericardial cavity and its contents has been shown by both experimental research and operations upon the living human body to be exceedingly rational, valuable and justifiable.

18. Exploration of the heart itself by puncturing it with a needle or knife to locate a foreign body or to detect pathologic conditions within the myocardium or its chambers, will at no far distant day be found useful, necessary, and recognized as an accepted surgical procedure.

19. Why should these conclusions be fallacious when it has already been shown that nine of the twenty-seven cases of heart wounds treated by suture have recovered?

A SIMPLE METHOD OF EXTENSION IN FRACTURE OF THE METACARPAL BONES, AND OBLIQUE FRACTURE, SIMPLE OR COMPOUND, OF THE FOREARM.

By W. W. GRANT, M. D.,

DENVER, COLO.

The functional results in the treatment of fractures are, in the main, so good that we cannot hope for much better, without material improvement in the methods of treatment. The time has come when we must give more thought and consideration to anatomical results and appearances, regardless of the excellent results, in useful limbs, obtained by present methods. The X-ray has demonstrated this necessity, which overrides the argument of mere utility. Though the skiagraph may exaggerate and distort, yet, in honest and capable

hands, it gives a fair illustration of the position of the fragments, and with the aid of the fluoroscope no serious mistake need be made. More accurate adjustment and coaptation of fragments is a manifest necessity, not only for the patient himself, but, in a medico-legal sense, to the surgeon. This is specially true in the treatment of oblique fractures of the long bones, and of special moment and consideration in the management of oblique fractures of both bones of the leg and forearm. Knowing that inflammation and complications incident to fractures of the forearm are more common than elsewhere, we also cannot forget that rotation, affecting, as it does, the future usefulness of the arm, is always involved. These considerations lend additional interest to these injuries. Despite union with much overlapping and displacement, or bony union of one and non-union of the other, good functional results are common, with no disfigurement in the outline of the limb; yet we cannot be content with this result and condition. If the surgeon does not protect his reputation by every possible safeguard, the X-ray will destroy it in the courts if he treats many fractures, now the most dangerous field to the surgeon.

If the X-ray reveals what the educated senses and manipulation of the surgeon will not, and this is sometimes the case, especially in fleshy subjects, and in fractures in the middle and upper third of the tibia and fibula, what is the remedy? If effusion of blood and lymph are, as Lane asserts, the chief obstacles to reduction and coaptation of fragments, then it is true that nothing short of operation by wiring, mailing or fixation by some such contrivance will enable the surgeon to thoroughly adjust and fix the fragments. There can be no question that blood and lymph do play im-

portant parts in the malposition of fragments. To this extent the application of splints, bandages or plaster will not correct the displacement; and extension, if delayed, will not be of much use. So whatever method is adopted, whether operation or the ordinary application of splints and extension, should be used promptly. Delay, with the action of blood, lymph and muscular action, tends only to maintain the fragments more rigidly in the position left by the force of the offending agent. The action of the muscles, it seems to me, is underestimated by Lane, while probably overestimated by others, and the influence of blood and lymph underestimated. The fact remains that the ordinary treatment of oblique fractures of both bones of leg and forearm by splints, box, plaster, silicates and extension, are often very unsatisfactory, as is the case in similar treatment of fractures involving the elbow joint.

I know of no other procedure short of wiring, nailing or the application of some fixation device directly to the fragments that will insure more perfect results. If either fibula fragment in any part is forced against the tibia, with or without a fracture of the latter, will any manipulation or force short of direct application to the fragments restore them to their proper place in apposition? I believe not; yet the outward contour and functional results may be satisfactory to the surgeon. How would the ordinary Pott's fracture, as treated, look under the fluoroscope or in a skiagram? Doubtless not very pleasing in its axial line and its relation to the astragalus.

As to oblique fractures of the forearm, extension is not ordinarily used. If compound, the fragments should be wired or nailed. If not compound, continu-

ous extension should be applied, or the bones should be treated by direct fixation. The latter has the advantage of not necessarily confining the patient to the room. Effective continuous extension does, and it should be maintained ten or fifteen days. We hesitate, quite naturally, to resort to the operative treatment, even with all the best aseptic agencies at hand, as long as fairly satisfactory results are obtained by other means. We cannot, too, be unmindful of the fact that without the ordinary text-books and teachings to support us, we are, in law and practice, exposed to the dangers always incident to new and unfrequented paths. Yet without courage and the force of individual conviction progress is not possible.

I have nothing new in principle to present. It is but the application of Buck's extension in the treatment of fractures of the femur to fractures of the forearm and hand, though the application is as appropriate in certain inflammatory conditions of the wrist and elbow joints. My attention was first directed to the matter in a desperate case that came under my care on July 4th, last. The National Guard in camp at Boulder was firing a salute with six-pound brass cannon when the premature discharge of a gun completely lacerated the soft tissues of the left arm of Corporal Palmer, who was acting as No. 1, from shoulder to hand; also badly lacerating the right hand from the palmar surface and front of wrist. The little finger was torn off at second joint, and the metacarpal bone was fractured in two or three places, completely detaching the proximal half. The second and third metacarpal bones were fractured near the metacarpo-phalangeal articulations; the third had a second fracture near the proximal end, and the fourth metacarpal also near the wrist was fractured;

the ulnar artery was severed at the wrist, and the pisiform and cuneiform bones so badly damaged that they were removed. The thumb and first metacarpal were the only parts connected with the hand that were not badly damaged. I was on hand promptly and by the prompt application of a rubber tourniquet around axilla and shoulder stopped the severe hemorrhage from the left arm. His left side was extensively and deeply burned, and face and eye burned and badly powder-stained. By the use of saline infusions and strychnine and external heat reaction was sufficient in two hours to justify operation. Under heart tonics and continuous subcutaneous infusion of normal salt solution, I promptly amputated left arm at shoulder. With the compound comminuted fractures of right hand, badly burned and lacerated tissues infiltrated with foreign matter, I could not expect the hand to escape infection. The bones were adjusted as well as possible, but to retain them in position and therefore respectable form to the hand, was, at the time, impossible. It was not safe to prolong the operation. So the badly damaged carpal bones and half of the fifth metacarpal were removed, vessels ligated, and the hand dressed and drained with iodoform gauze between loose splints. Hot water was applied continuously for ten days. Suppuration ensued and finally the middle flexor tendon, which was badly lacerated, and some of the palmar fascia sloughed. At the end of two weeks I made incisions over the fractures of middle and index metacarpals near the phalangeal joints, as the greatest disfigurement existed at these points, and fastened the fragments with silver wire. The bones were soft, and; in order to hold all the parts in as good shape as possible (splints and bandages

being practically useless), I applied the following extension apparatus to the fingers (index, middle and ring): Moleskin plaster the width of the fingers was applied back and front, all passing in a loop through triangular ring with a horizontal bar, about two and one-half inches in diameter, and each finger bandaged separately. These were supported by a wide strip of adhesive plaster covering all fingers. A small cord was tied to the ring and carried over a small pulley screwed into the ceiling lath. Three one-pound weights were attaced by a small iron hook to the distal end of the cord. Counter-extension could have been applied by bandaging the arm (if deemed desirable) just above the elbow to the body, commencing with a loop of bandage around the arm just above elbow and passing at first backwards around the body. With this arrangement the patient could lie down, sit or stand, and the extension would not vary. If desired, the arm could have been fixed by bandage to the bed frame. Splints, with antiseptic gauze drainage to the palm, were lightly applied during the treatment, which was maintained for two weeks and was easily borne. For fracture of forearm wide strips of plaster should be applied to back and front of hand and through the ring as before. In this case my aim was not only to save the hand but to preserve its form, with as much motion as possible to the fingers. I am gratified to state that the thumb, first metacarpal and wrist motions are perfect, and there is some movement to index and ring fingers, with promise of more. The flexor of middle finger was so badly lecerated and burned that sloughed, and the others are necessarily crippled by adhesive inflammation. Had the other hand and arm been intact, there would have been great temptation to amputate this hand; but in

this day of bold and radical surgery, conservatism, too, achieves its greatest triumphs, which splendidly justifies the greater labor, time and skill devoted to it. Although the hand suppurated rather freely and there was extensive sloughing of the skin on left side from shoulder to waist line, which, with the hand, healed slowly, there was no general infection at any time. The patient at this time is in very good condition, and has one good arm and a fair hand, and will become again self-supporting.

I am aware that ambulatory extension to the forearm, with the lower part of the humerus as a fulcrum, is sometimes made or attempted, but I doubt if efficient continuous and comfortable extension can, in this way, be satisfactorily carried out.

OBSERVATIONS IN EUROPE.

By JOHN PRENTISS LORD, M. D.,

OMAHA, NEB.,

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My first two weeks after landing were spent in sight-seeing in Italy. By telegram from Venice I ascertained when I might see Prof. Bassini do some hernias. His response having indicated 9:30 on the following day, I accordingly went to Padua (twenty-three miles distant) the same night to be on hand promptly the next morning, when, to my great satisfaction, I saw the author of what the vast majority of the world's surgeons consider the best operation do two cases. Prof. Bassini is about six feet in height, with no superfluous adipose; has a dark complexion, which is rendered the more striking by his almost white hair and beard.

which is rather short. He is probably about 60 years of age.

Prof. Bassini has sufficient command of English to make himself understood. He seems to trust his nurses and assistants but little and none of the former were in sight. He uses silk of rather large size for all his sutures and ligatures, and this he prepares himself by sterilizing three times by dry heat, after which it is reserved in 2 per cent. carbolic solution. He handles his own instruments and threads his own needles. The patient was brought to the amphitheatre upon his bed, which was rendered portable by a truck, various forms of which are quite generally used on the continent. Perfectly naked, he was lifted to a padded table covered with rubber sheets, one of which was used to cover his legs and another to cover his trunk above the waist; these were secured in front by forceps. The patient's legs and arms having been strapped to the table, anesthesia and the scrubbing was begun, the professor taking active part in the latter. Much water was used, the patient had on no clothing and there was therefore no concern. The operator and his one assistant had on rubber aprons and wore rubber overshoes, about what big rubber boots would be with the legs cut off, so that they were not afraid to use water. This escaped by drainage from the cement floor. After this the Professor lifted from large jars containing 2 per cent. carbolic solution some rubber sheets which he laid across the patient, leaving the abdomen bare, which he then covered by a full width, double thick piece of gauze, wrung from the same solution; into this he cuts a hole, through which he operates. I was quite surprised to see a man of so great renown doing nearly all of the detail work himself; indeed he seems to de-

pend upon himself only. What service his one assistant did render seemed very unsatisfactory. Although I could not understand Italian, he talked and gesticulated so vehemently that there was no mistaking his displeasure. He worked barehanded and used his fingers in isolating the sac, after which he swept his finger about, separating the peritoneum from the abdominal wall; indeed he separated all of the structures more freely than I had ever seen before. Though his incisions were no freer than common, he seems to have a faculty of making very wide retraction, which exposed very fully the deeper parts. The cord was held aside by a strip of gauze secured by a forcep to the gauze covering. The sac is tied with heavy silk, thrown around twice and then transfixed, and the same silk, uncut, is then used for the first sutures of the internal ring. These are five or six in number and interrupted, each tied with three knots. A little point in technique interested me in his suture of the fascia of the external oblique. The needle was introduced Lembert fashion, on the upper side, which affords a wide contact of the borders of the united fascia and therefore a stronger union; it also renders the relaxed fascia after large hernias more taut. This suture is continuous after one or two interrupted ones. Wherever the hemostats had been placed, a ligature was used without exception. Great care was exercised in obtaining a thoroughly dry wound, which was thoroughly "milked" before the last skin suture was tied. His skin suture has an individuality: it is continuous, but before the needle is pulled through the skin, both edges of which have been pierced, the thread is wrapped twice about the needle, so that when it is drawn up tightly it does not slip and it affords a firmness and

support to the wound which causes the skin to stand up as a ridge. The wound is then covered with two or three wet compresses, then dry ones, copious pads, and cotton to envelop the whole abdomen and thighs. At this time the foot-pieces of the table are lowered and an orderly places two iron rods of about five feet in length (which are tied together at one end) upon the table and under the patient's buttocks and pushes the tied ends of the rods up between the shoulders; the rods are then separated, when, by stepping between them and the patient's legs, which are made to lie lengthwise the rods, and raising both to his armpits and pulling the patient off the table to his scapulæ, a most excellent opportunity was afforded the professor to apply a plaster-of-Paris bandage well onto the ribs and including the thighs. He applied it very closely and made considerable pressure over the site of operation. This bandage and dressing remains eight days, when it and the sutures are removed, and a collodion dressing applied. If the hernia has been a large one the patient is kept in bed fourteen days; if not he is allowed to to be up, after removal of the surtuse, and is discharged in twelve or fourteen days. Prof. Bassini claims never to have suppuration and hence no recurrences. The entire absence of sheets and towels about the patient was a novelty to me. They were taken off from the first patient, rinsed and put into the jars containing carbolic solution. Prof. Bassini rescrubs, rinses his rubber apron by squeezing water from a big sponge which he presses against his chest, and completes his toilet by rinsing further with carbolic solution wrung from gauze. The rubber sheets are now called into requisition for the next case. There was not a towel, sheet, linen apron or gown to be seen, and by

this sozzling and rinsing process in the operating room it can be understood that the laundry work for the operating department of Prof. Bassini's clinic is practically nil; an object lesson of some practical importance, which it might be well for some to profit by, in some measures at least, for our American use of linen becomes an enormous item, and can only be realized by those who pay the bills.

Berne is the capital of Switzerland, in a beautiful and picturesque location with a number of famous Alpine peaks about her. The people are wholesome, honest, and industrious, and the traveler who has run the gauntlet of the beggars and highway robbers of Italy draws a sigh of relief, for he begins to feel a kinship with the people. I will here digress to relate that on one evening in Naples myself and some ship friends, a party of ladies and gentlemen, were obliged to make our escape into a drug store from about one hundred brats, beggars and cab drivers, who had completely surrounded us and thus followed us for blocks. So that after a few weeks of Dagos and macaroni diet we are quite ready for a change. Though in Switzerland and in Germany and Austria you see women drawing the carts with the dogs, you respect the honest, sturdy qualities which characterize most of the people. I saw much of interest in Berne, it being a university town of about 40,000 people and contains the Kanton Spital (State Hospital)—the real name is Insel Spital or Island Hospital, because built on an island in the river in the days when security was necessary.

Prof. Theadore Kocher, who is the head of the surgical department, is a slender, wiry man of about 65 years of age. In the late sixties he contributed to surgical science his method of reducing subcoracoid

dislocations of the humerùs, and his name has since been among the first of the world's surgeons. He now possesses the distinction of having operated on more goitres than any other surgeon in the world. The number now considerably exceeds 2,000. This seemed incredible to me until I had traveled in Switzerland, southern Germany and Austria, where they are seen almost hourly. I think that I saw more men than women. It may be because men are more upon the streets and in trains. Of the three cases which I saw Prof. Kocher do in one day, two were men. His son told me that there were about an equal number of men. Prof. Kocher has discarded general anesthesia in these cases and uses cocaine 1 per cent., which seems quite satisfactory. His son, who is his first assistant, informed me that they had no trouble from secondary hemorrhages since its use. In his hernias Prof. Kocher does the operation bearing his name, and while it seemed sufficient for the small hernia which I saw him do I should not consider it sufficient for larger ones, unless the internal ring was dealt with. Both operators and assistants use ordinary white cotton gloves, and they are changed if the operation is protracted, especially when it comes to the application of ligatures and sutures. In operations for goitre and other exposed surfaces the sutures are removed on the second day and the wound covered with bismuth and water, and then sealed with collodion. This they claim leaves no stitch scars, and a minimum scar line, to which I can testify from a number of convalescents seen in the wards. I received many courtesies at Berne and saw and learned much, for which I am greatly indebted to the whole Kocher family. There are two sons who are doctors.

An American is soon impressed by the slowness of things in general on the other side. It is a characteristic of Europeans. The patient gets little in the way of relief until diagnosis is made. American students confess that they learn little on treatment. An appendicitis must be proven beyond peradventure before operation is considered, and if any considerable headway is attained by the disease the operation will be deferred until after attack or until upon the post-mortem table. I presume that a European was never guilty of operating for a pain in the right side. They confess their slowness in this respect and excuse themselves because of custom. They express admiration for our advanced state in this respect and seem to regret their slowness. Some men, like Sprengel, Rehn, and Rotter, have taken sides with us, but the storm aroused in opposition to these views in the 30th Congress is evidence of the general status of professional opinion.

The Germans have a keen appreciation of the great value of early gastroenterostomy for the relief of cancer and ulceration of the pyloric end of the stomach. And these conditions are recognized at the earliest possible moment, that a preliminary operation may be done for exploration and gastroenterostomy if the patient's condition requires improving before being made to withstand the more formidable procedure of gastorectomy. Prof. Krause did two gastroenterostomies consecutively for the delectation of Dr. Tinker (associate editor American Medicine) and myself, one morning. The suture method was used. A cross-anastomosis of the jejunum was also done to insure against regurgitation. Each operation was done in about forty minutes.

Those continuing to suture admit a greater operative mortality than is sustained after the use of the button, which is perhaps most largely and successfully used on the other side by Czerny. His method is the typical procedure as is most commonly used in this country and so largely popularized by Mayo. Czerny uses a button which has an expanded lower half to ensure the stomach against its ingress. Dr. Peterson, Prof. Czerny's assistant for ten years, informed me that they had one man living three and a half years after gastroenterostomy for cancer and another two and a half years. They do the operation with great frequency and the mortality has been reduced to about 2 per cent. in favorable cases. The operation is so satisfactory to their patients that many decline further operative interference. The old word interference is used advisedly. At Heidelberg, in the service of Czerny, I saw three patients in a row who had been operated on for concurrent gall-bladder and right kidney lesions, all presenting a special triangular incision, of which the professor was especially proud. Prof. Czerny is too big a man to turn aside from his work to toady every "incontinent" chasing American who happens that way, and he has a rather poor reputation for hospitality in consequence. The German professor is an aristocrat and is a czar in his authority. Members of the profession less favored are very conscious of the great gulf fixed between them. There is the same pedestal under the feet of the German professor that elevates the German army officer into an exclusive atmosphere. This can only be appreciated by hovering about the bases of the said pedestals.

Italian surgery is something like the English, not quite clean enough to enable them to dispense with

antiseptics. The writer, however, respects the surgery that can use buried silk with perfect results.

Vienna is no longer a Mecca for the better class of Americans, though all pay her a visit. Her laurels have faded since the passing of her illustrious masters. It is thought that the influence of Von Eiselsberg will restore her prestige in surgery. Lorenz impressed me as a most remarkable man, and his popularity seems well deserved. His influence pervades Europe, and his methods are largely imitated. The unbloody method of reducing congenital hip misplacements and correcting club feet seems to prevail to a large extent. The impression of Hoffa was not so favorable and his standing in the profession is not as good as was anticipated. He is regarded as more commercial than scientific, and his extensive orthopedic establishment at Wurzburg indicates his thrift.

The assessment of every man, woman, and child who works for wages in Germany for the maintenance in hospital, in case of sickness or injury, seems to be a most excellent economic principle. It certainly helps to maintain some of the most perfect hospitals which I have ever seen; and every thinking man will agree that it is better that it should be thus paid for than to be a gratuity to a class who would otherwise be dependent. This is accomplished by the state collecting from both employer and employee a certain per cent. of their weekly earnings. In Berlin the lodges have this arrangement with some of the hospitals and the attending physician or surgeons receive small fees for their services. After learning of these things and witnessing life in the German Vaterland it seems to me that the fact that our German patrons are the best pay of any class is only a natural sequence of this mode of life and training.

Sprengel, of Braunsweig, is very popular with Americans and many go to see him. He is very approachable, is kind, and painstaking in all his attentions to visitors, and his qualifications are of the highest order and the volume of his work is quite equal to that of other German operators. His hospital is a state institution, but not connected with a university. The complete Zander system is established here, as at several other institutions, and machinery and apparatus do the work taken up by osteopaths in our country.

Not until I had traveled as far north as Leipzic did I see any catgut used, and from there on it was the usual material for ordinary ligatures. Here one is still further impressed with the custom in Europe of having large hospital grounds, with walks, grass in abundance, beautiful trees in great variety, and numerous flower-beds and fountains. The grounds here cover an area of twenty-three acres. It is needless to say that they are greatly enjoyed by convalescent patients and its value to them is inestimable. The children have a sort of pavilion which is open in the summer and closed in winter, and is arranged for a large amount of sunshine. Five cases of exstrophy were seen here in Prof. Trendelenberg's wards that had been operated on by his method, which consists in dividing the posterior sacro-iliac ligaments, which permits of an approximation of the separated pubic bones and a lessening of the defect in the bladder and abdominal walls, so that a limited plastic operation closes the defect. They are suspended about the hips by a leathern girdle, which is crossed so that the weight of the body causes continuous lateral pressure to be exerted upon the ilia, which maintains apposition of the pubic bones until healing is complete. A switch in his oper-

ating amphitheatre causes a motor to close the skylight and windows by heavy iron screens so that subjects may be illustrated on the screen by a large modern projection apparatus, which reflects images from photographs, drawings through slides, or shows equally well opaque objects and surfaces.

I was very favorably impressed by the work of Durrhsen of Berlin, who does all his pelvic surgery through the vagina when it is possible to do so. He removes cysts of all sizes, and ordinary myomas, deals with adhesions very readily, takes away distended pus tubes, and is only balked on fibroids of large size. His vaginal incision is from the meatus to the cervix, and including it if a complete hysterectomy is contemplated. The bladder is dissected free from the vaginal wall and held upwards by means of a retractor, when with wide retraction of the perineum the full capacity of the vaginal outlet is available, through which his manipulations are made and the deliverance of diseased organs effected. This operator has been working along this line for several years and has certainly become must proficient in it. It must be seen to be appreciated. He claims less shock, a more easy and speedy convalesence, absence of a scar which is now objected to by many women, and deters them from having the needed work done. His results, as far as seen, and from a perusal of records and charts, seem to justify his claim. His late contribution to this subject may be seen in the transactions of the 30th German Surgical Congress.

The impression prevails among Americans visiting Europe that the French surgeons are rather more patronizing than are the Germans. Perhaps this may be temperamental, but it seems apparent that the Paris-

ians are desirous of winning back the lost prestige of many years ago when Paris was second to no other place on earth in up-to-dateness in matters pertaining to surgery. The Paris surgeons seem less heavy upon their feet in operating than the Germans. Their kennels and facilities for doing dog surgery at the university are certainly in keeping with the importance of this branch of instruction. Separate buildings with circular cemented pits or miniature ampitheatre are provided, so that several classes can witness operations simultaneously.

The American, handicapped by lack of the languages on the continent, feels himself transported upon arrival in England. The vastness of London grows upon one during all his stay. Her old hospitals, with her surgeons loth to give up reliance upon antiseptics, have caused the profession to place a mental question mark after the name of much that is English in surgery. But a city which comes so near being the center of the world in commerce, will naturally possess many of our greatest men. And if one goes to her leaders he will not be disappointed either in the work witnessed or in the courtesies extended.

Victor Horsley is about 45 years old and has accomplished already a large life-work. His name has been prominently before the profession for many years. His name was recommended to the Royal Society at the age of 26, and it was so without precedent, that it raised considerable opposition, but it did not bar him. No American in London can afford to miss him. His attentions are so constant that it really becomes embarrassing to receive them, and you begin to wonder whether there is any limit to British hospitality. For when he cannot profitably occupy you he will put you

into the hands of his friend Arbuthnot Lane, who is equal to Horsley in his genuine goodfellowship and ability to show you work of a high order of originality, interest, and profit. Having displayed an interest in his operation for cleft palate, he caused his housemen to send out for three new cases, which he operated next morning. His method impressed me so favorably as to cause me to try it since my return with highly gratifying results. It consists in turning a large flap from one side and making a hinge of its median attachment. Advantages claimed are less cutting, ability to close successfully a very wide defect, even in very young babies. The author operates upon them from one to six weeks of age, because as he says little cutting is done and at this age the vessels are so small that hemorrhage by this method is very slight and the operation is uniformly well borne. Mr. Lane renders a large proportion of his simple fractures compound, by cutting down and replacing the fragments and securing them by wire, screws or nails. The clavicle, the neck of the femur and oblique fracture of the tibia are almost invariably so treated in his work at Guy's. He never allows fingers unprotected to enter the wound, relying upon his instruments for this purpose.

The general profession in England is very slow and self-satisfied. Our Mr. Saunders' London agent informed me that his sales were much larger in Scotland and in Ireland than in England. And my own observations seemed to confirm his statement that the former were more progressive. McEwen of Glasgow and Stiles of Edinburgh are examples of sterling worth. Their work is of the highest order. Prof. McEwen did his hernia operation for my special benefit and asked me to prepare myself the same as themselves, which

consisted in scrubbing ten minutes and immersion three minutes in 2 per cent. carbolic solution, after which scrapings of cultures were taken from beneath the finger nails of each and all those concerned in the operation, and the names of each, with other data, was placed upon the culture tube. The writer had a better opinion of the McEwen operation after seeing it done by its author. McEwen, like Lane of London, is much in favor of the immediate wiring of fractures where there is difficulty in the proper reduction of the deformity. Stiles of Edinburgh is an advocate of more immediate operative intervention in tubercular lesions of joints. There is not only much time saved but possibly bad and even disastrous results often averted in this way.

Much that was seen in Europe was mediocre, some was actually bad. While I was well pleased with what I saw for the most part, and was delighted with some of the masters, yet I must remind myself that I sought out the most famous men, and when I compare their work with the same class in our own country, they rather suffer by the comparison.

SYMPTOMS, SIGNS, DIAGNOSIS, PROGNOSIS AND PALLIATIVE TREATMENT OF PROSTATIC HYPERTROPHY.

By LEWIS SCHOOLER, M.D,

DES MOINES, IA.

Failure of recognition by both patient and physician of the signs of this affliction, due to the insidiousness of their onset, renders the condition of the patient more or less grave. Nevertheless the patient is conscious of the fact that he is called upon to void his urine more

frequently than usual, and that he rises twice or more times during the night, and succeeds in passing but a small quantity at a time, but is mentally satisfied that he has entirely emptied the bladder at each effort. Being familiar with these symptoms he attributes these signs to an inflammatory condition. The higher level of the urethral orifice prevents the complete evacuation of the contained urine, leaving in the beginning an amount of residual urine of two to four ounces in the early stages of the disease. As the symptoms increase and the difficulty becomes more marked the bladder becomes distended frequently to its fullest capacity and, instead of a desire to void, the patient finds a constant dribbling of urine, which is nothing more than the overflow from a greatly distended and damaged viscus. Hemorrhage may in some cases be an additional evidence of this change. The distention of the bladder forms a tumor above the pubis reaching sometimes to the umbilicus, and if a digital examination be had per rectum, the prostate can be readily outlined and its size determined at least approximately, as the lateral lobes in my experience are always involved, the signs of enlargement being present in the entire gland and not confined to a single portion. It must be understood that this is true to an equal extent of all parts, the difference being one of degree and direction. A gland may be so enormously enlarged that it interferes with defecation without any effect on urination. These are the cases where the enlargement is in the direction of the rectum.

Where the enlargement extends towards the fundus of the bladder, beginning at the margin of the bladder and the urethra, the direction is upward and backward carrying the posterior urethral extremity with it.

Tumors or distinct areas of growth may appear in the gland as adenomas and, like the gland itself, may grow in any direction and produce distortion of function. While these symptoms are present (most of them) in all cases, they are not typical in every case. The majority of the cases of this affliction do not result seriously, although occurring in those past middle life. In many persons the age should not be computed in years, but by the actual condition of the patient, particularly the circulatory system. The symptom of arterio-sclerosis should always be elicited if present on account of its important bearing upon the prognosis.

The loss of muscular power should always be carefully determined for the same reason,—for upon this symptom frequently hinges the chances of infection. A hopelessly damaged bladder, with atheromatous blood-vessels, is usually indicative of a long-standing disease, and if infected, another complication is added which may belong to other afflictions not connected with prostatic hypertrophy. Systemic evidences of infection are inconsistent with a healthy mucous membrane of this organ.

Diagnosis.—Where stricture is absent in a case of the prostatic age, the catheter will usually clear up all doubts and remove the residual urine which is one of the strongest proofs of the existence of prostatic trouble. Rectal examinations should not be omitted; information is thus elicited of a definite character concerning both lateral lobes, though the median lobe is not accessible by this method.

The residual urine is of the greatest importance and the amount should be accurately measured. The amount of residual urine gives a hint, not only as to the condition of the prostate, but also of the bladder,—

the quantity increasing where the bladder is weak and the muscles have lost their contractile force. It also shows the chemical changes the fluid has undergone, which is a matter of great importance.

Retention or difficulty in urinating is experienced in many cases of moderate hypertrophy, depending upon the preponderance of enlargement of the urethral portion of the lateral lobes, as well as the median, the latter raising the urethral level markedly.

The relaxed, diseased and sagging bladder, frequently almost completely enervated on account of long retention or a diseased condition of the blood-vessels and muscular fibres, should not be overlooked. All sudden stoppages of urine should not be attributed to an enlarged prostate. Tumors of the bladder or fibrous degeneration, causing acute flexion of the urethra in the one and loss of contractile force in the other, may produce the same symptoms as an enlarged prostate, even though atrophy of that gland has taken place. Acute inflammation and ulceration of the posterior portion of the urethral canal should never be lost sight of in our efforts at diagnosis. The symptoms being so variable and in some instances entirely lacking,—it is well to bear in mind a few of the most prominent signs and if they are absent other causes must be looked for.

Anatomically considered, or in the non-enlarged prostate, we can safely eliminate the middle lobe, and Socin's position in combating the statement that the middle lobe is the most frequent enlarged, is entirely correct. The deception in regard to the third lobe arises from the fact that most hypertrophies are unsymmetrical and that portion directed toward the bladder rises in that direction and is felt as a projection at the posterior portion of the neck of the bladder.

The relaxation and sagging of the posterior wall exaggerates the apparent rise of the urethral opening. Exceptional cases are observed in which there is a nodular growth of the prostatic urethra which produces a tortuous canal and makes catheterization difficult and leads to the impression that there is a stricture of the urethra. In these cases a metal catheter combined with a rectal examination is of the greatest value as the growths compressing the urethra are situated just within the anus. The exact condition within the unopened bladder can only be determined by the use of the cystoscope, but in the worst cases the introduction of this instrument is attended with so much difficulty, and not being within the reach of all, its use is not as common as it should be.

Prognosis.—The prognosis depends upon the early diagnosis and prompt treatment. In the majority of the cases it may be said to be good at least under palliative treatment, though not under medical treatment. I know of no drug or combination of drugs that can be relied upon to produce a diminution of the enlarged gland except in cases of simple inflammation. Manufacturing chemists have lauded sanmetto, ichthyol and other substances, but in my experience they are absolutely worthless. Indeed it is difficult to perceive how any drug can influence a senile enlargement any more than a senile atrophy.

Palliative Treatment.—Massage I believe to be of no use whatever, and where it has been considered helpful I think that the diagnosis was at fault. If the increased deposit of tissue could be removed by this method, it would certainly be necessary to apply it to the entire circumference of the gland and not to one-third, which is probably all that can be attacked successfully.

Aspiration is a temporary procedure which may be resorted to for the purpose of immediate relief of the symptoms, and allows time for the preparation of the patient for the installment of more radical measures or for the adoption of this plan permanently. It is claimed that tubes of a suitable shape, when worn for a long time, produce good results. The method is unscientific and extremely troublesome and in no case have I seen any real benefit result.

Catheterization, in a fair per cent of cases, is successful in evacuating the urine and keeping the bladder from becoming distended. The greatest objection to this method, aside from being troublesome to the patient, is the almost certain one of infection. There are few persons who can be depended upon to observe a rigid asepsis for any considerable length of time in these cases; besides, a catheter life is a life of doubtful value in most cases. It has little if any effect upon the gland, but where it can be used and in the hands of those who are fortunate enough to escape infection, it is far preferable to continued aspiration or permanent drainage. But in these days of asepsis and improvement in surgical technic, it seems like a lack of courage on the part of the surgeon to recommend catheterization to a patient who is too old to comprehend the dangers of it, and who is usually unable physically and mentally to carry out an asepsis rigidly enough to insure his own protection.

Dilatation aims to preserve a channel for the voluntary discharge of the urine, per vias naturales, and is of greater value and less dangerous than any of the above mentioned procedures for the reason that it is or should always be done by the surgeon himself, thereby insuring against infection and traumatism.

When properly performed it causes a yielding of the tissues already formed and if instituted early enough prevents the encroachment of new deposits in the immediate vicinity of the urethra. It will give the best results, however, in incipient cases, and the catheter should be used frequently in order to ascertain if the patient is emptying the bladder completely. Perhaps more favorable results would be obtained by this method, if patients could be made to understand the necessity of frequent seances and their longer continuance.

Cystotomy is also a temporary or procrastinating procedure and, aside from furnishing relief of a transient nature, produces its best results in cases where the bladder is infected or where cystitis is present as a complication. It affords also a means of examination of the interior of the bladder and enables the surgeon to determine whether the cause of the obstruction is in the bladder, or at the junction of the urethra and the bladder or along the prostatic portion of the urethra, and whether there is a distinct enlargement of the so-called middle lobe, compression from pressure of the lateral nodular or unsymmetrical enlargement, or a sagging toneless bladder; and if inflammation be present it permits rest by the rapid escape of the urine as well as affording an opportunity of cleansing thoroughly the entire affected area. It also allows an opportunity for operation under the guidance of the eye and permits the pushing down of the gland by the finger in enucleation; but as these features are to be considered by others I will not infringe upon their rights.

In the consideration of all of the above methods none are intended to be radical, none are calculated to re-

move the cause; all are, however, intended to, partially at least, restore functional activity and to produce results sufficiently satisfactory to prevent the necessity of more radical procedures, and until within the last five years they were the best that the profession possessed. The dissatisfaction with them is clearly shown by the constant aim to discover something that would give better results. In a few cases they have served the purpose well and in the future will be resorted to in a very few selected cases, but the better knowledge of the anatomy of the prostatic gland and its pathology calls for an advance in our therapeutic resources that does something more than secure relief with a constant menace to the life of our patients through infection, as well as a method that does not require eternal vigilance and a knowledge of the fact that the life of the individual depends upon the mechanics of artificial urination.

THE PATHOLOGY AND ETIOLOGY OF PROSTATIC HYPERTROPHY AND SUPRAPUBIC DRAINAGE AS A METHOD OF TREATMENT. PROSTATECTOMY AND MYOMECTOMY RECOMMENDED.

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The terrible sufferings which are caused by a lasting retention of the urine, and the dangers to life which accompany it, as well as their relative frequency in old men, were well known to the physicians of ancient

times. Hippocrates mentions this condition and adds that it is incurable. This opinion of Hippocrates was held by physicians for many centuries.

Morgagni, in his "Epistolæ de sedibus et causis morborum," printed in 1761, was the first to shake this pessimistic opinion by his researches. He showed that the ischuria and concomitant difficulties of defecation were due to enlargement of the prostate. John Hunter corroborated Morgagni's assertion and devotes one chapter in his "Treatise on the Venereal," London, 1786, to prostatic hypertrophy. He mentions the difficulties of micturition in old men due to the enlargement of the prostate and gives some illustrations of specimens. Everard Home, in his practical observations on the treatment of the diseases of the prostate gland (London, 1811 and 1818), as well as Desault and Bonet, who were pupils and followers of John Hunter, also corroborate Morgagni's discovery of prostatic hypertrophy and its concomitant evils.

Up to the present time the etiology of prostatic hypertrophy has not been cleared up. A completely satisfactory explanation of the process has not been found. Sir Henry Thompson defined it as an "idioplastic tumor" in his lectures, which I had the great pleasure of hearing. Enlargements of organs during the middle and younger years partake largely of an inflammatory nature, or are found to be small cell infiltrations. Knowing that old age somewhat inclines towards or favors the development of tumors, we are not surprised to find that a part of the sexual system may show a non-inflammatory enlargement at a time when this system, in all its other organs and in its functions, is undergoing a retrograde metamorphosis and is being more or less put to rest. However, let us remember

that Sir Henry's definition is not explanatory in any sense, and leaves the etiology of our subject in the dark.

Reginald Harrison seems to think that the hypertrophy is caused by overexertion or overwork of the organ, whose function he conceives to be aiding the bladder in the evacuation of its contents. He thinks that the main purpose of the prostate is to furnish a muscular support, "primarily to the bladder and its contents and secondarily to the adjacent parts," and thus seems to regard enlarged prostate as a form of compensatory hypertrophy similar in its etiology to the well understood hypertrophies of the muscular walls of the heart. Guyon's theory is opposed to this view, he regarding the hypertrophy as due to arteriosclerosis of the urogenital tract.

White agrees with Velpeau that in this disease we have an analogue of the fibromyoma uteri. Sir Henry Thompson favors this view, and I also think that the myoma of the prostate is analogous to myoma uteri, and I think that it may be referred to developmental or congenital cell-nests which lie dormant in early life and are only incited to late enlargement by the incidents accompanying the functions of the genito-urinary organs in health and in disease.

Thus we must admit that the etiology of prostatic enlargement is not understood, and the speculations which we have before mentioned are only a little more respectable than those speculations which bring diet, occupation, modes of living, abstinence and indulgence, sexual habits, gout, rheumatism or gonorrhea into direct or indirect etiological relation with the disease. In most of the diseases in which the etiology is not cleared up the pathology is also incomplete. In the

disease under discussion, however, the numerous researches by pathologists and by practical surgeons have well-nigh cleared up the pathological anatomy and also added to the knowledge of the functional disturbances which we observe as the symptoms of prostatic hypertrophy.

Cancers, sarcomata, tuberculosis, echinococcus, are rare diseases of the prostate which produce enlargement of the organ. Adenoma rarely occurs, but the hypertrophy of the prostate which is under discussion now is of very frequent occurrence in the aged. In an investigation which I made upon 100 men over 60 years of age and taken consecutively as they came before me in my work in St. Louis, Mo., U. S. A., I made a rectal examination in each with a view to determine the size and condition of the prostate. Of this number only fifteen complained of symptoms which were undoubtedly due to hypertrophy, but there was noticeable enlargement in thirty-one cases without any functional disturbance. These data, being based on a physical examination of the living patient, are probably not as reliable as the figures of v. Dittel and Sir Henry Thompson, who investigated cadavers. The former found 22 per cent. and the latter 34 per cent. of enlarged prostates in cadavers of aged men, the exact ages not being known in all the cases. I have twice found enlargements of the gland, in the form of nodules, in boys. These observations were accidentally made upon two brothers, aged 7 and 9 years, who had died of diphtheria, and I am of the opinion that these small interstitial myomata will be quite commonly detected if looked for by those who have opportunities of frequently examining the prostate glands of young men and boys upon the dissecting table.

Prostatic hypertrophy, when microscopically examined, is found to consist of an increase of the non-striated muscle cells and connective tissue which lie between the tubular glands. These latter are displaced by the hypertrophic muscle fibers and in extreme cases are nearly absent. We are justified in denominating the condition which we find in most cases as myomatous hypertrophy, or if the myoma assumes the shape of a tumor we may speak of a myoma or fibromyoma of the prostate. In rare cases the enlargement depends upon a hyperplasia of the glandular structure, and then we may speak of diffuse or circumscribed adenoma of the prostate. The cases of acute swelling of the prostate partake of an inflammatory or infectious character and do not come under the scope of this investigation, but their existence is undeniable, although I have never had an autopsy of a case of acute prostatitis.

Hypertrophy may be found in a diffuse form, so that all parts of the organ are affected alike and there is an even enlargement of the whole gland; or tumor-like nodules, sometimes as large as a walnut, may be found in the form of hyperplastic knots of tissue, which are plainly visible upon sections made through the organ. All parts of the organ may be hypertrophied, but there are certain parts which are favored and most frequently attacked.

Mercier was the first to show that the hypertrophy usually begins at or near the isthmus of the glands and that it frequently forms what we call the middle lobe, which projects into the bladder, near its neck, in the form of a teat. Behind this lobe the so-called recessus or cul-de-sac, in which the residual urine accumulates, occurs. In other cases, the lateral lobes, or only one of them, may become hypertrophic.

The cause of the sufferings of prostatics, as well as the danger to which they are exposed, is the retention of urine which often occurs as a result of the hypertrophy. Hypertrophy of the prostate does not always lead to retention of the urine, and it is often the enormously large prostate of unchanged contour which does not produce essential or severe troubles. The more localized hypertrophy, affecting only one part upon one side, asymmetric hypertrophy as it were, or a small degree of enlargement, may cause severe trouble. This takes place when such parts of the organ are affected by the growth as are in close relation to the lumen of the urethra, and project into the canal or neck of the bladder as they increase in volume. A hypertrophy of the lateral lobes may and often does compress the urethra laterally and change it into a vertical narrow slit. When only one lateral lobe is enlarged the urethra is laterally displaced and pushed out of the median line. Mercier proved that the hypertrophied teat-like middle lobe will obstruct the internal orifice of the urethra when the bladder is contracted for the purpose of micturition. He claims that an evacuation can only take place after a greater distention of the bladder by the accumulation of more urine is accomplished. But as soon as a part of the urine is discharged the valve will again become sufficient and prevent complete evacuation. Thus the residual urine is accounted for in a simple mechanical way, and we can easily understand the interruption of the stream and the tenesmus or strangury. We can understand the somewhat paradoxical phenomenon of incomplete evacuation while the patient can voluntarily pass urine. I have the conviction that this valve-like action of the middle lobe is

only possible when it is very small and thin, but that it acts more like a dam when it is broad and stiff.

There are some cases in which the internal urethral orifice projects into the lumen of the bladder. It looks much like the portio of a virginal uterus when the hypertrophic growth of the prostate has grown upwards and backwards into the bladder. In a case of this kind the urethral opening will be closed or narrowed, and will be projected into the cavity of the bladder as the muscular coats contract. The mechanics of this condition seem to be that the urine contained in the bladder will exercise an even pressure from all sides upon the cervix-like prostate, and the more pressure that is exercised by the muscular wall of the bladder upon its contents the more will the urethra be compressed and the more difficult will be the voiding of the urine. In this form of hypertrophic prostate there will be nothing to hinder the introduction of the catheter and the drawing of urine if only the catheter is long enough.

In old men there is always more or less of a cul-de-sac at the posterior lower part of the bladder, and we can readily see how an enlarged middle lobe must help to increase the size of this excavation. According to v. Dittel* and his assistant, Schustler, middle lobes of the prostate without enlargement of one or both of the lateral lobes are very rare. I have seen but one case of solitary enlargement of the middle lobe; and according to my own observation the commonest and most usual form of prostatic hypertrophy is the bilateral enlargement of the lateral lobes in a nearly symmetrical form; and when one lobe grows more than the other the one will bulge over and cause a depression in the other and

*"Contributions to the Knowledge of Prostatic Hypertrophy," Medicin. Jahrbucher, Zeitschrift der K. K. Gesellschaft der Aerzte in Wien, Vol. 24, 1867.

the urethra will be compressed or completely closed so that the urine cannot escape. In this condition the vesical mouth of the urethra is not the cause of the retention as much as the two opposite contiguous lateral lobes of the enlarged prostate.

The first bad effect of retention of urine, when not relieved by the catheter, is upon the walls of the bladder in a purely mechanical way by pressure of the mass of urine on the vesical wall. This, of course, causes dilatation of the bladder. The long continued exertion of the muscular coat in trying to expel the urine will make greater demands on the muscular coat, and the constant efforts to overcome the obstacle will be responded to by a compensatory hypertrophy of the muscular layers of the bladder wall. The result will be a peculiar net-like concentric hypertrophy of the bladder, which is known as (vesica en colonne) trabecular bladder, which is so often seen at autopsies of patients who have narrow urethral strictures. The intravesical pressure frequently causes diverticula and pockets to form, by the bulging out of the mucosa between the muscular trabeculæ.

A chronic and extreme retention of urine finally causes dilatation of the ureters and of the pelvis of the kidney and may cause an absorption by pressure of the secreting tissues of the kidney. When the entire urinary system or canal is thus dilated the valvular opening of the ureters, which is affected by their oblique entrance into the bladder, is overcome. The vesical orifices of the ureters are found widely patulous. The dammed up urine in the bladder, in the ureters and in the pelvis of the kidney forms an uninterrupted column of fluid in a single large receptacle which is not divided into sections or divisions by a septum or valve of any kind.

It is easily understood how, under such circumstances, an incipient purulent cystitis rapidly spreads to the pelvis of the kidney and to the kidney substance, and will cause a pyelonephrosis.

The prostatic patient is usually first notified of his trouble by a difficulty in voiding urine. This difficulty grows as the hypertrophy increases. Some day a retention of the urine takes place. Symptoms of irritable bladder, frequent desire to urinate, and pain, often very severe, are other concomitants. There may be a backache and tension in the region of the bladder. Even when spontaneous voiding of urine is still possible, the complete evacuation of the bladder may be impaired or interrupted from a want of power in the bladder-wall to contract. A part of the urine in the cul-de-sac or in some pockets may become stagnant. Now, if by means of an unclean catheter, or by the introduction of some bacteria, that always inhabit the anterior urethra as was shown by Lustgarten and Mannaberg, into the bladder, the urine is decomposed, a catarrhal cystitis is soon developed. Decomposed urine causes a continual irritation and the cystitis spreads into the deeper layers of the bladder-wall and in the presence of pyogenic bacteria we soon have a suppurative or gangrenous cystitis.

The greatest danger consists in the upward progress of the infection, through the ureters to the kidneys. We often find that the infection spreads rapidly, as there is nothing to interrupt its progress from cystitis to pyelitis and nephropyelitis. Prostatics nearly all die of pyelonephritis sooner or later. The clinical picture is that of pyelonephritis and sepsis, except in some cases when both kidneys are severely affected and they die an easy death with uremic symptoms.

Suprapubic Cystotomy as a Method of Drainage in the Treatment of Hypertrophy of the Prostate.—Suprapubic cystotomy is an operation which finds its application in: (1) stone in the bladder; (2) tumors and growths; (3) hypertrophy of the prostate; (4) foreign bodies; (5) exploration of the bladder; (6) drainage of the bladder.

It is a recognized and successful method of treatment in all of these conditions. The technique varies with the object in view. If it is desired merely to open the bladder for the removal of a foreign body the wound may be closed at once. If we desire to establish drainage the bladder will be kept open and a button-hole may be established by stitching the mucosa to the skin. This fistula may be left open for weeks or months, but can be closed whenever the object of the drainage has been achieved. I will not describe the method of operating because it is a simple trick devoid of danger in the hands of any experienced surgeon. I regard it as one of the minor surgical procedures and may assume that you will all agree to this proposition. A little reflection will show that the operation in men is only indicated when the bladder is full or can easily be filled with either air or water. The use of a rectal bag is unnecessary; in short, the operation is one of the simplest and easiest in all surgery. But one landmark is required, and that is the symphysis pubis, behind which the bladder is always found and is easily punctured or incised with or without an intravesical guide. I have only to do with the operation to-day in its relation to drainage as a method of treatment in prostatic hypertrophy and its most troublesome complication, cystitis.

Some ten years ago I got the notion that suprapubic

drainage would cure prostatic hypertrophy. I reasoned that by the drain I could give complete physiological and mechanical rest to the bladder, and that I could prevent the unrest due to the alternating filling and emptying of the bladder. We all know that nature does its work of repair rapidly and painlessly if we can only give rest to the diseased organ. This axiom applies to all diseases without exception, including the many forms of infection. What is infection, unless it be the unrest produced by microbes and their toxic products upon the tissues? Remove the toxic agents and the cells will be at rest,—there will be no inflammation. The best definition of inflammation is: Inflammation is the response made by the tissues to toxic agents which invade them. I had often seen the mucosa of the bladder, which had become inflamed and ulcerated, change into its normal condition in a few weeks after a suprapubic section and drainage; and of course I knew that the cystitis accompanying many cases of hypertrophic prostate would disappear under the free drainage and the rest which was given the bladder by this simple operation. There can be no doubt on this point, but I had hoped that the hypertrophied prostate, under the influence of rest, would undergo an absorption and atrophy and that a decrease in size which might be permanent would take place. In this latter hope I was doomed to disappointment.

It is true that in all cases of prostatic hypertrophy in which I made free permanent drainage for from three to ten weeks the urine became normal in color, the cystitis was much improved and in some cases entirely cured. It is also true that the enlarged prostate in each case became smaller, and that the patients were ex-

ceedingly comfortable during the time that the drainage was kept up. A gentleman, Mr. T., who had a severe cystitis, and who suffered extremely from his enlarged prostate, was so much relieved by the suprapubic drainage that his praise of the service rendered him was most grateful to my ears. "Why, just think of it, I sleep all night without getting up, do not have to use the catheter, have no temperature at bedtime and my appetite has returned." This gentleman died suddenly one morning as the nurse woke him to bring his breakfast. He just raised up in bed to greet the nurse and fell over dead. In that case I was permitted to hold an autopsy and I found that the prostate was quite large and that there was a large myoma in the left lateral lobe of the prostate and a small one the size of a filbert in the right lobe which projected across the median line. It seems clear to me now that no matter how long I might have drained this man's bladder the myomata would probably not have atrophied, and I am reasonably certain that the cystitis would have returned with the closure of the suprapubic drainhole and resumption of the catheter life. I may add that the death was due to embolus and that most likely the primary thrombus came from a plugged vesical vein.

In several of my cases I had the great pleasure of seeing the prostatic hypertrophy become much reduced and remain in this condition for over a year, the patients regarding themselves as quite cured and having thrown away their catheters. But I am compelled to report to you that with the exception of one man they all, twenty-six of them, were again obliged to take up the catheter life which they had abandoned for from a few weeks to fifteen months.

I am convinced that as a radical cure of prostatic hypertrophy the suprapubic drainage is a failure. This result or conclusion might have been anticipated by reasoning from the basis of the facts which I brought out in the pathological part of my paper. It was there stated that hypertrophy of the prostate is a form of neoplasm or tumor. It is either a diffuse myomatous hypertrophy or it is a localized formation of nodular myomata, except in rare instances which were alluded to in the first part of the paper. *Myoma cannot be made to disappear by castration neither in men nor in women, nor can it be made to do so by giving the parts in which the myomata are located physiological and mechanical rest by means of the suprapubic drainage.* I have had no chance to try the effect of castration and drainage simultaneously, and hence cannot say what the result of this treatment would be, though I do not anticipate a good result. But there is no doubt that this treatment would be justifiable. The method must be tried. It is highly improper to condemn any rational procedure a priori. As long as we claim to be working upon a scientific basis let us not condemn methods before we have tried them.

The following table gives the results of my suprapubic drainage work and the fate of the patients so far as known to me:

Cured	1
Leading a catheter life as before drainage	8
Operated on after Bottini, and improved	2
Operated on after Bottini, and not benefited	1
Operated on after Bottini, and died on third day after the cautery, of septic pyelonephritis	1
Operated on by perineal prostatectomy	2

Of these one died of pyelonephritis on the 4th day after operation, the other seems to be cured.

One patient is now being drained suprapubically for the second time 1
Died of pyelonephritis, senile gangrene or pneumonia, 6
Disappeared and condition unknown..... 4

Total 26

All of those whom I drained suprapubically were eloquent in their praises of the relief afforded to them. The patient who died of embolus was entirely relieved of his usual trouble and suffering by the drainage, and I am not sure that his death ought to count for much against the suprapubic operation. I regard the suprapubic drainage as the best method of giving temporary relief to those patients who are not willing or are not in condition to undergo prostatectomy. The cystitis can be cured by drainage and will not always return after the drainhole is closed.

The word prostatectomy would indicate that the whole of the prostate is removed. This has not been the case in most of the operations that have been reported. In those cases in which the whole prostate was removed, either by way of perineal section, or by the suprapubic route, or by a combination of both, the mortality has been fearful. I am unable to give reliable figures, because many of the total prostatectomies have died without being put on record. The fact which stares us in the face in estimating the value of a new operation by statistics is that only the good results are reported and the bad ones are buried. Hence, statistics based on reports of a few cases by a few men are unreliable and always misleading, because they indicate a mortality which is too low.

The results of partial prostatectomy are much better as regards mortality, and also in respect to functional

improvement of the diseased organs. Thus after a partial prostatectomy the mortality is very low, and the function of voiding urine is preserved to a degree which is entirely satisfactory. This operation is the one which I have named myomectomy. Prostatic myomectomy is the operation which I think will be adopted very generally in the future for the radical treatment of hypertrophy. The name hypertrophy of the prostate is misleading, and I would rather use the term myomatosis of the prostate. I have made sections of many specimens and parts of enlarged prostates, and even in the hardest and most resistant tumors have been able to show non-striated muscle-cells. I am convinced that the bundles of connective or fibrous tissue which we find in the sections are all derived from the connective tissue which accompanies the blood-vessels. This perivascular connective tissue surrounds the arteries and veins. It is known in biology as the lymph-sheath. All arteries and veins are surrounded by this lymph-sheath, and this lymph-sheath is continuous with the lymph-spaces around the capillaries. In my own sections I could prove that whatever of fibrillary connective tissue we find is developed from the perivascular sheaths of blood-vessels entering the prostate. The principal enlargement is made up of bundles and nodes of non-striated muscular fibres which cross each other and intermingle with each other exactly as we see them in cases of myomatous uteri. Sometimes the nodules can be easily shelled out of their beds, but oftentimes this process is very tedious, and a difficult morcellement is found to be the best way of extirpating parts of the prostatic lobes. The cases in which we find no well-defined nodules of myomatous

nature, but just an even hypertrophy of the organ, all parts being equally enlarged, are uncommon. The nodular form is more frequently found. The number of cases I have examined is too small to permit of a more definite statement at the present writing.

Knowing the dangers of catheter life and the shortening effect it has on the duration of life, we must deliberately decide the question as to its usefulness, and we must not recommend it without great hesitation. The time when a prostatic first seeks our aid and assistance is the time when we must decide what to do. The first time a patient has retention is the time when he must either be taught to use the catheter for the purpose of drawing off the residual urine three or more times per day, or the surgeon must decide to get rid of the cause of the trouble by some other means. I believe that in the long run much suffering and the unavoidable dangers to life and health which accompany prostatic hypertrophy can be spared to old men if right in the beginning a myomectomy is performed. The operation, if done early, before the patient's strength and recuperative powers are wasted, will be a safe one accompanied by a low death-rate.

The technique of this operation, known now as perineal prostatectomy, I shall not describe in this paper, but I will say that the operation has been frequently performed, and is highly recommended by Bryson, of St. Louis; Ferguson, of Chicago; Guiteras, Syms and Fuller, of New York. The methods which they have described and the methods of Alexander v. Dittel, Harrison and others are before us.

My operation, which I have called myomectomy, does not aim to remove the whole prostate, but merely those

parts of it which have impinged upon the vesical end of the urethra, and have interfered with the function of the bladder in such a manner as to prevent complete evacuation of its contents. Myomectomy is a perineal partial prostatectomy, and its technique is practically the same as that of the perineal prostatectomies which are now before us in recent surgical literature. In order to perform a myomectomy of the prostate the capsule of this organ needs not to be removed.

CONCLUSIONS.

1. In old cases of hypertrophied prostate, palliative measures are sometimes preferable to radical measures.

2. Drainage of the bladder by the suprapubic route is preferable to perineal drainage in cases of cystitis, because the suprapubic method gives the sphincter apparatus more complete rest than the perineal buttonhole or fistula.

3. In cases of hypertrophy in which the patient's health has not been injured by chronic cystitis or nephropyelitis, the dangers of myomectomy or perineal prostatectomy are minimal, and in these cases a radical and satisfactory functional result can be achieved by myomectomy.

4. Bottini's operation must be regarded as a palliative measure, intended to enable the patient to evacuate his bladder more completely than before. It will probably have a very limited usefulness and will be crowded out of practice as the technique of myomectomy or perineal prostatectomy is perfected.

5. Bottini's operation is a dangerous operation and must not be undertaken unless most careful measurements have been made. It is often followed by ex-

travasation of urine into the perineum, and perineal section must be done in order to save the patient's life as soon as swelling of the perineum is noticed.

6. Myomectomy done through a perineal incision is the operation which promises the best results, and is the operation of choice. It is applicable to the greatest number of cases in which permanent cure may be expected, the kidneys being physiologically sufficient and unimpaired. The greatest dangers associated with prostatectomy are produced by injuring or removing parts of the capsule of the organ. Myomectomy must be done without this dangerous manipulation. As long as the capsule is left intact there is but little hemorrhage, and the danger of infiltration of urine and sepsis is reduced to a minimum.

SUPRAPUBIC PROSTATECTOMY.

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Considered from a scientific standpoint, the surgery of the prostate is of comparatively recent date, and this advance has been largely due to the increased employment of suprapubic cystotomy for stone devised by Franco in 1556. During the past twenty years the suprapubic incision served the same purpose as exploratory laparotomy. Direct examination, both visual and digital, has resulted in devising new procedures as well as the development of old methods of operative interference.

Statistics made during the past (what might be called forming stage) of prostatic surgery should only be considered in a general way. During such a period

of incomplete knowledge and imperfect diagnosis surgeons lacked judgment as to the better operation for the condition present. The result was that operations were deferred until the patients were nearly moribund; they were hasty and incomplete because made upon the worst cases, where the symptoms demanded immediate relief; the condition itself being one occurring upon the declining side of life, when sclerotic arteries and degenerative changes, especially of the kidneys, are common. If one places dependence upon statistics, palliative operations were more fatal by far than the more recent operations for radical cure. Present statistics to a large extent indicate the judgment and skill of the operator in diagnosticating conditions and choosing methods of attack suitable to the case. There is more fear of uremic death in those affected with arteriosclerosis and high tension arteries from simple drainage, than in the radical operation upon men with better arteries and yet with chronic septic cystitis.

The surgeon who adjusts the operation to the patient, and not the patient to the operation, is the most successful. A careful review of the general literature of the subject would indicate that about one-half of enlarged prostates can be reached either from above or below equally well, according to the skill and inclination of the operator; that about one-fourth can be performed better from above and one-fourth better from below, and from anatomical or pathological conditions the combined operation will be necessary in certain cases.

Our choice of operation will be influenced, first, by the condition of the gland. There is not much material difference of opinion among the numerous

writers upon the operative and autopsy findings of enlarged prostates. Watson states that the most common location of enlargement is bilateral and median, being about one-half the cases; median only in one-third, bilateral only in twelve per cent., unilateral with median or separate pedunculated growths rare. This about conforms with the statements of Sir Henry Thompson and Dittel, while McGill lays some stress upon the uniform circular hypertrophy. S. Alexander, from a larger number of autopsies, presents the most practical points from an operative standpoint:

"The layer of prostate behind the urethra does not enlarge. The enlargement occurs in the lateral and developing middle lobes. The lateral growths depress the urethra, the middle raises its inner posterior end, thus increasing the length and curve of the prostatic urethra. The lateral lobes are nearly always encapsulated and glandular. The middle enlargement may be of three varieties: First, muscular—those cases with a bar; second, glandular and then encapsulated; third, hypertrophy of mucous glands and bladder tissue."

Could we accurately diagnose the cases of muscular bar, the prostatotomy of Mercier or the Bottini cautery operation could be considered; but to cut through the capsule of a glandular enlargement and not remove it is surgical insult.

Of known conditions which influence our choice: The fleshy individual, with thick perineum, long prostatic urethra and high-lying prostate, is one in which a suprapubic or combined operation will be indicated. Those with large dilated bladders may be reached by suprapubic incision, while the stiff-walled, contracted bladder is possibly more suited to perineal attack.

Those with stone present and unknown condition of the bladder, but presumably with enlarged prostate, are best explored from above. By unknown conditions we are influenced as well; for instance, in cases of symptomatic stone, yet not found by search, but with known enlarged prostate, suprapubic incision gives better bladder exploration. In the emergency operations made in the country, where retention is present and immediate relief demanded, but neither time nor facilities possible for careful examination, the suprapubic opening is indicated. Those with cystitis and old or acute secondary changes in the testes,—and such cases are not rare,—will often improve greatly from castration.

We still have a large class of prostatic sufferers in which there are no symptoms of stone, little or no cystitis, and short perineal distance, in which a perineal operation is unquestionably the better method. The ease of operation, perfect drainage and earlier recovery in chosen cases no doubt justifies this choice; the special retractors of Ferguson and Syms much simplify the accessibility of the gland from below, and it is quite possible from present indications that this method will be developed into the operation of the future by making earlier diagnosis of conditions and operating before these cases reach the stage of necessary suprapubic incision. The perineal operation may then bear about the same relation to the suprapubic that the radical operation for hernia does to the radical operation employed in cases of strangulation.

Meyer has classified the various methods of operating for prostatic hypertrophy into direct and secondary. Of direct methods we have suprapubic, subpubic, urethral, perineal and sacral routes; Mercier's

method of prostatotomy, injections into the gland, stretching and massage. Electrically we have galvanic and cautery. The more direct methods are castration, vasectomy and Bier's operation of ligating the internal iliac arteries. Of the various methods of suprapubic operation we have:

1. Suprapubic prostatectomy without perineal drainage. (McGill.)

2. Suprapubic prostatectomy with perineal drainage. (Fuller.)

3. Suprapubic prostatectomy with perineal section and drainage. (Belfield.)

4. Suprapubic cystotomy with perineal prostatectomy without perineal drainage. (Nichol.)

5. Suprapubic cystotomy with perineal prostatectomy and perineal drainage. (Alexander.)

Operation.—After the usual preparation for operation one-sixth of a grain of morphia is hypodermically administered one-half hour previous to operation; this greatly reduces the amount of anesthetic required. Anesthetic—ether preferred but chloroform more often indicated. Position—Trendelenberg. A catheter is inserted, the bladder irrigated and inflated with air and a rubber band applied to the penis to retain the air pressure. This method of Bristow's has displaced fluid tension and the Peterson rectal bag and ordinarily gives from one and one-half to three inches of space between the peritoneal fold and the pubic bone. A vertical or transverse incision is made down to the recti muscles with blunt separation of recti and digital separation of areolar tissue above the bladder, which is easily felt, the wound retracted and two sutures applied to the bladder wall which act as tractors; the bladder is incised and digital exploration made. If it

is considered best to complete the prostatectomy from below the superior opening is used to force the gland down upon the enucleating finger in the perineum. Should the operation be made from above the tendons of the recti muscles are cut laterally one-half or three-fourths inch each side of the incision. The bladder incision is enlarged and a blade of the scissors is passed into the urethra and the other over a projecting lobe and the capsule incised, the enucleation being made with the finger. Single pedunculated tumors are removed with scissors, cold snare or by morcellation. This latter method is not employed if it can be avoided, as it leaves tags of tissue which must undergo necrosis. An assistant can make strong perineal pressure and upward pressure with two fingers in the rectum against the prostate or the operator can temporarily employ a rubber glove on one hand for this purpose. Muscular bars are treated in sight, by cautery or prostatotomy. Hemorrhage, the bugbear of surgeons in this work, may necessitate a gauze pack, which must be so placed as to be brought out above, or by perineal incision, or in form of a circular pack fastened to a thread passed through the urethra and drawn out through the penis when removed as done by Keyes. The Witzel method of closing the bladder by folding its wall over the tube for drainage is very successful in preventing leakage in suprapubic drainage. Where from certain conditions this cannot be done, the automatic siphon suction apparatus of Dawbarn is very useful. Some operators fasten the bladder to the abdominal incision. This favors a lack of drainage in the space of Retzius and after recovery these cases complain of pain at urination, the concentric muscle fibres then working from two fixed points, the base and the point of attachment above.

The suprapubic operation requires from three to five weeks hospital care, although in the aged it is best to get them off the bed as soon as possible.

THE INDICATIONS AND LIMITATIONS FOR THE BOTTINI OPERATION.

By LOUIS E. SCHMIDT, M. Sc., M. D.,
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It is almost needless to state that this operation, like a great many others, has suffered from the exalted enthusiasm of those who have recommended it for every case of prostatism. On the other hand, it has been severely condemned by many surgeons who have never practiced it, but have derived their conclusions after theorizing.

In reviewing this subject, I do not wish to take up your time with the usual discussion of the minor details, but desire to present the merits of the Bottini operation, and advance positive indications for, and limitations of, this operative procedure. Neither will I present an array of statistics, for it is understood, where there has been such variance of opinion, that they can only cause incorrect conclusions. In this manner, it will be possible to narrow down the cases fitted for this procedure to a comparatively small per centage of all the cases of prostatic hypertrophy which cause urinary symptoms, because it is these only that we can take into consideration.

In looking over the literature, we find a slight variance of opinion as to the exact indications. Some think that a true prostatic hypertrophy with urinary symptoms, whether with or without retention of urine, is sufficient. On the other hand, we are advised

to wait until it is necessary to use a catheter to relieve the symptoms.

I will not discuss whether or not it is advisable to operate only where we find an incomplete retention of urine, or whether it is best to operate early before retention sets in, but where we have urinary symptoms, or whether or not palliative treatment should be tried previous to any operative interference. It is certainly not too early to operate as soon as a patient is obliged to use a catheter. Now, if the necessity of this procedure, i. e., catheterization, can be avoided altogether by an operation, the subject must be seriously considered.

It has been put forward that the earlier the operation, the less advanced is the pathological condition, and the less often do we find complications, the greater the chances for perfect success, and statistics have proved this to be true. Now, where it is positively known that manifold conditions of the prostate gland cause one and the same series of symptoms, it is absolutely necessary for the success of the Bottini operation to select the cases which are favorable for this procedure. In other words, we have certain limitations of the prostatic pathological changes which, when operated on by this method, permit of good expectations as to the ultimate outcome. These pathological changes of the gland, naturally, from the character of the operation, must occur just at the border between the urethra and the bladder. There can be no difference of opinion on this point.

Absolute contraindications can only be put forward in such cases where the anatomical pathological conditions pre-exclude the possibility of any favorable

result. We can definitely state that when there are alterations in the prostatic urethra, as nodules or angulated projections which may cause obstructions, or when in another distinct class where the changes in the gland impair or completely abolish the functions of the bladder, this operation should not be considered.

Innumerable writers have warned against operating when nephritis and other morbid conditions of the kidneys, pyelitis, ureteritis, cystitis, sacculated condition of the bladder or atony of the bladder are present. Then again, when arterio-sclerosis is very marked, in other words, when the general conditions are poor. Age of patients must also be considered, especially if some form of pyemia or arterial disease or both are present. Absolutely and most emphatically it can be said that good results have been obtained with these conditions in different cases. It is true that we must take these into consideration when deciding on such a step and never forget that when one or more of these are present, not to force the operation. Yet they certainly are only relative contraindications.

The so-called "prophylactic" Bottini operation of Orville Horwitz must, in every case, be followed with good results if the case is properly selected and if technique of operation is faultless, because in these cases none of the contraindications or relative contraindications are present.

As with everything else that has withstood the test of time, so with this operation. Here we find objections raised to it largely by theorizers—surgeons who have never performed it, and by those surgeons whose results have been unfavorable on account of

poor technique in poorly selected cases and who have operated but few times. It is true that objections of a solid nature have been brought to bear against this operative procedure. They are, to the greater extent, not justifiable. The one objection which has been held up as the most flagrant of all, is the charge of "working in the dark." With anyone who has the necessary diagnostic technique at command, this can scarcely be true.

I wish to emphasize that if it is not possible to make a thorough cystoscopic examination, it is best not to undertake the operation. In other words, if cystoscopy cannot be employed, the operation should not be considered. Again, when using the Freundenberg-Bierhoffs incisor, we can, just at the moment of beginning the operation, see whether or not the incisor is in the correct position. After each incision, an examination can be made. After the completion of operation, if the technique is correct, the different incisions as to depth and length can be examined. With all these helps at our command, the charge to a certain extent does not hold.

Another accusation is that we have cicatricial contraction. This cannot be the case if the barrier or barriers are completely severed, yet here again it might occur if the technique is not correct. Still another charge is that it is necessary to operate in certain cases several times in order to obtain certain results. This is becoming less necessary, as the selection of cases has become more careful and the technique more perfect.

That complications occur cannot be denied. For the most part, they are caused by poor technique. Phlebitis, hemorrhage, incontinence, perineal abscess,

vesico-rectal fistula, acute cystitis, cysto-pyelitis, and minor complications have been noted. We know that the anterior incision, which has been practically abandoned, was the cause, in the large majority of cases, of phlebitis. Here the vessels of the prevesicular space became involved; again this can be put down to the lack of exact information in regard to the case. For this same reason, phlebitis of the hemorrhoidal veins has been caused. Again and again this fact stares us in the face and we see why we may cause periprostatic and perineal abscesses, incontinence of urine, vesico-rectal fistula, etc., simply because the minute diagnostic details are neglected previous to the commencement of the operation. It must be admitted that this is not the only cause, as accidents will happen here as in any other branch of surgery; but I do not bring this forth as justifiable.

Hemorrhage of a dangerous character has been noticed immediately and as late as ten to twelve days, and even later, after operation. In those cases where it has occurred within twenty-four hours of the operation, it can scarcely be denied that the hemorrhage was due to a crushing of the glandular tissue and where the blade was not sufficiently heated to cause an eschar which would remain in place at the time of returning the blade. The hemorrhages of a later period are caused, in a certain number of cases, by improper after-treatment, i. e., by rough and unnecessary catheterization and insufficient care of bowels, diet, or by rising too early after operation—in other words, by lack of proper after-care. Some of the late hemorrhages undoubtedly have been caused by the natural separation of the burnt tissue from the prostatic tissue, leaving small vessels patent.

These certainly are few in number and cannot be avoided.

Uncertainty of prognosis will hold in a certain number of operative procedures; but the uncertainty disappears in the ratio to the certainty of detailed diagnosis and correct technique. This cannot be doubted, for the truth is readily to be seen. For this reason this objection no longer holds truer in this than in any other operative procedure.

In a recent article, the statement has been made that the Bottini operation is an easy one and that anyone can perform it. It certainly is best to emphatically contradict such a statement. It is on account of such teachings that we hear of such bad results and absolute condemnation of this operative procedure. It is a step only to be taken by one thoroughly familiar with the handling of instruments within both the bladder and urethra, this so as to have precise conception of each step in an operation with such an instrument as the Bottini instrument. Furthermore, it is necessary to be able, and also to be willing, to recognize at once any accident which may occur at the time of operation, or any complication which may arise at any subsequent time. By the correction, if necessary with a secondary operative procedure, life can be saved in some cases, and in others, the results of the Bottini operation improved. The results, in other words, depend oftentimes on the rapidity and accuracy with which any of these secondary steps are performed. To illustrate, in my case where the instrument was displaced and where I cut into the membranous urethra. As soon as I was certain of it, I made a median perineal incision and inserted a drainage tube. This patient made an uneventful recovery and with very good results.

In cases of hemorrhage where it is severe, a suprapubic cystotomy is often indicated.

It must not be forgotten that the after-treatment of this operation plays a part in the results. A patient after this operation immediately requires careful watching. Even should a permanent catheter be in place, we must be on the lookout for urinary infiltration, perineal abscess, etc. When such conditions are excluded and after the permanent catheter has been removed, the question arises, how often and when to catheterize? This is not as important as by whom, because great care and delicacy should be used.

This review is not an attempt to compare the results of one operation with the results of other methods, but an attempt to show that there are a limited number of cases in which the Bottini operation can consistently be recommended; and when the cases are carefully selected, and if technique be perfect, the outcome must be satisfactory. From this it must be concluded that the operation stands on a perfectly safe and sound basis compared to any operative step.

From the foregoing it appears to be justifiable to draw the following conclusions: Good results of the Bottini operation will depend, first, on the correct selection of cases; second, on the proper technique of the operation and proper after-care; and third, the immediate correction of errors or mishaps.

DISCUSSION.

DR. E. WYLLYS ANDREWS, of Chicago: Mr. President—The operation (Bottini's) has been condemned as blind surgery, as I have heard as eminent a man as Dr. Senn condemn it in the hands of those who are contented with half measures in the matter of examination. As to the so-called Bottini point above the edge of the prostate and its false position, this can invariably be avoided by palpation with the finger-

tips before turning on the current. I have had no experience with the improved instrument which Dr. Schmidt has described or alluded to, and therefore I consider that I am not up-to-date, perhaps, in the technique. But with the older instrument, before I employed the Freudenberg modification, and used the original Bottini instrument, I had a few cures which were so brilliant that I am satisfied the operation must have a future. The operation is done without anesthesia, not keeping the patient in bed more than three or four days, and produces immediate relief of obstruction that had previously lasted for years; in spite of numerous criticisms, these facts must be admitted by everybody.

I have employed the instrument of Dr. Ferguson with the greatest satisfaction. The particular instrument which I had seemed to me to have too small a staff, so that I bent it twice in using it. I like to get considerable leverage over the pubic bone, in order to make strong traction downwards on the pelvic floor, forcible enough to produce hemostasis or artificial anemia. The first time I ever saw it used was by Dr. Ferguson himself, and all the time the instrument was held in place the parts were rendered ischemic, so that nearly all hemorrhage took place at that stage of the operation when the instrument was withdrawn.

Many of you doubtless remember that Dr. Parker Syms, of New York, devised a prostatic retractor consisting of an inflatable balloon of water introduced into the bladder, drawn out through a buttonhole in the meatus, and forcibly dragged upon to pull the perineum downward.

Dr. John B. Murphy, of Chicago, demonstrated, by means of blackboard illustrations, the different methods of removing the hypertrophied prostate.

Dr. Leonard Freeman, of Denver, Colo.: In dealing with cases of hypertrophy of the prostate, we must not forget that we have to contend with entirely different patients from what we have in cases of myoma of the uterus. The patient is not always in a good condition for either the suprapubic or perineal operation. He may be in a condition when it would be extremely precarious to do anything at all, and sometimes patients absolutely refuse to have a cutting operation made either above or below, with all the hemorrhage that goes with it, and they refuse sometimes to have an operation which is deforming, such as castration, etc. In those cases the Bottini operation seems to fulfill an office, although my experience with it has not been large. I have operated probably on twenty cases, in some of which my results were a little disappointing, in others exceedingly gratifying.

Not long ago I had two patients, two old men, come into my office who had been using the catheter for a long time upon whom I had operated a year and a half ago. Both were in excellent condition; they were perfectly satisfied with their condition in every way. When we can obtain such results as these, it seems to me the operation certainly has a future for it in selected cases. The greatest difficulty

with the Bottini operation is not with the operation in itself, but the selection of the cases upon which we wish to make the operation. Sometimes I think we are justified in trying it without selecting our cases. In such cases as I have mentioned in old men, who are afraid of an operation, or whose ureters are in bad shape or worn out practically by the continued cystitis they have had for a long time, we can attempt the Bottini operation without much danger of death, because the mortality is not as high as it is from other operations. I feel that we cannot always tell with the cystoscope what we are going to do. It is easy to look into the bladder through the cystoscope; it magnifies the projections, and minimizes other things, so that what we see with it is not always an absolute indication for operation. Personally, I feel that where the prostate is a very large one and can be reached through the perineum, certainly this is the best route to undertake, providing the patient is in a good condition to warrant it. But if the patient is not in a good condition, we may try the Bottini operation. Perhaps the latter operation offers the best chance in those cases in which the middle lobe is enlarged. We can try this operation with a good chance of success in perhaps eighty per cent. of the cases, according to the statistics of Freudenberg and others, in those cases in which the patients do not want a more severe and bloody operation made.

DR. W. W. GRANT, of Denver, Colo.: I wish to say a word or two in reference to suprapubic drainage. The point brought out in Dr. Mayo's paper as to the relative value of the two operations is certainly commendable. In many cases the combined operation is unquestionably the best; but how any surgeon can consider draining uphill an ideal method, I do not understand. I believe all surgeons recognize the value of gravity in any operation in which drainage is a matter of importance; but how anyone can think suprapubic drainage is as good as to drain downhill through the perineum, I do not understand, and in this respect I must differ from Dr. Bernays. Certainly, in the chronic cases of cystitis, with enlarged prostate, with or without pus, it seems to me, that where drainage is a necessity and of so much value, the external perineal operation, with the modifications which have been so beautifully brought before the profession by Dr. Ferguson, has a bright future, and especially in the cases which I speak of as demanding drainage.

The Bottini operation I believe to be of no permanent benefit in cases of very great enlargement of the prostate. In those I should commend, and in the future certainly try the operation of Dr. Ferguson in removing as much as possible of the prostate through an external perineal incision, aided, if necessary, by a suprapubic operation, then closing the suprapubic wound and draining through the perineum. That, it seems to me, is an ideal method of drainage, and an ideal operation.

DR. DANIEL N. EISENDRATH, of Chicago: I think, probably, it is just as profitable sometimes to hear some of our mis-

haps as to see and hear of some of our successes. I wish to speak of one mishap which Dr. Andrews did not get a chance to mention, and also of one or two that occurred to myself. In regard to the technique of suprapubic prostatectomy, it has been suggested that in order to get more room to remove the prostate in that way, the attachment of the recti muscles to the symphysis pubis should be cut. The difficulty I had in one case taught me that I would never try to do it again, at that point. But if I cut the recti, it would be at a distance one and a half to two inches above the attachment. In this case I cut the insertion of the recti to the symphysis pubis, and following the operation the patient had cystitis, with infection at the line of union, which was produced undoubtedly by suturing it with formalized catgut to the symphysis, and as a result distinct and marked prolapse of the bladder wall occurred, which persisted for a long time after the operation.

In a case that Dr. Andrews did not mention, but which I had the opportunity of performing an autopsy on, a Bottini operation having been done, Dr. Andrews inserted the Bottini incisor in the ordinary manner, and immediately following the operation a tremendous hemorrhage occurred which persisted for a number of days, and finally death ensued. I performed an autopsy on this case (I regret that I did not bring the specimen here this morning), and the specimen shows that the incision was made through the posterior wall of the prostate, and that it continued almost into the membranous portion of the urethra, and as a result it tore some of the larger arteries, resulting in a profuse hemorrhage.

Profiting by this experience, in one case I operated on I thought this complication could be avoided by doing a preliminary suprapubic cystotomy. I inserted the incisor along the upper edge of the enlarged prostate, I cut through, turned on the current, after I thought I had cut through well, and put it through the distance of the incisor, but this was followed by hemorrhage and sepsis. I lost the patient. In this case the same accident happened that had happened in the hands of more expert operators than myself, and that is, cutting into the membranous portion of the urethra, the incisor slipping much farther than it was intended.

DR. GEORGE HALLEY, of Kansas City, Mo.: I want to make a suggestion with reference to Dr. Ferguson's incision. I cannot add anything to the beauty of his description of the operation, but I think if he will modify the incision that he has illustrated here, he will succeed a great deal better, and give himself more room for drainage. The operation I would suggest is one that I have been doing for a long time. It is to begin the cut midway between the anus and the tuberosity of the ischium, thrusting the knife well in, not quite far enough to cut the transverse perineal artery, but in front of the muscle, carrying the incision in a semi-circular manner at an equal distance from the anus around to correspond to the point on the other side; go back through the perineal fascia in that way, and you are right

down on the prostate. You can shove the anus back as far as you please. You can put your fist in and the structures here are not in the way. By making this incision you have a much larger field for working in.

DR. H. P. HAMILTON, of Omaha, Neb.: I was very much interested in Dr. Bernays' paper on the pathology of the prostate gland, because it touched upon points with which we are not very familiar. It brings out our clinical experience as to the connection of the prostate gland that we do not find in text-books. It also brings out the fact that we have a myoma instead of a fibroma of the gland to begin with. We get a proliferation of the cells of the muscular structure of the part, and not of the connective tissue to begin with; consequently we get embryonic tissue developed in the muscular structure of the gland which can be easily removed. That is the special point I wish to speak of in Dr. Bernays' paper. But later on, we do not have this embryonic tissue to deal with, but true fibrous or connective tissue, which serves to constitute a fibroma. So further on, in these cases, we do not have a true myoma, but a fibroma to deal with. Therefore, I have had some difficulty (and I presume other physicians have had difficulty in the same line) in connection with the operation as described by Dr. Ferguson, where we open the capsule of the gland. This capsule is developed from the outside on account of the proliferation and irritation in the glandular structure itself, together with the muscular structure. There is not only a capsule which is developed on the outside, but there is embryonic tissue which is supplied to this muscular structure in the beginning, and this can be shelled out, if we incise the tumor or provisional capsule that has been formed. If the operation is done at this time, we can take a curette, as described by Dr. Ferguson, and remove the contents with ease. But after it is further developed and the embryonic tissue becomes changed into fibrous or true connective tissue, we have a different condition to deal with. We have not embryonic tissue there to deal with, but true fibrous tissue or the so-called interstitial tissue, as it were, extending around the entire gland, which causes an enormous amount of thickening in some cases, and we not only incise the capsule, but we have to incise the fibrous tissue, and in removing it we find great difficulty in taking away the fibrous structure because of its being so firmly adherent to the capsule. I believe that there are a great many cases, as described by Dr. Ferguson, where an incision made in the capsule, for the purpose of removing the contents, will be exceedingly difficult. We all understand that it is very easy to remove the glandular structure; it is easy to remove embryonic tissue in its development, but when it has changed to true fibrous tissue it is difficult, and there is but little true glandular structure in the part, so that when we incise the connective or fibrous tissue, to get in there, we find but a small amount of true glandular tissue, which we can remove by the curette, and the fibrous tissue is not removable either by the finger or by the curette. There are certain cases of this

type where I believe it would be extremely difficult to complete the operation described by Dr. Ferguson, although in the great majority of cases, if seen early, I think this operation would be perfect.

DR. ARTHUR DEAN BEVAN, of Chicago (by invitation): I feel as a medical student almost in listening to these papers. I have had a rather limited experience in prostatic work, and feel that my real position here is one in which I can be instructed rather than attempt to give any instruction. I must say, however, that viewing the entire situation to-day, I am afraid that the men who are urging operations on the enlarged prostate are doing so in too radical a manner. I am fully satisfied that there is a great future for the operative treatment of enlarged prostate. On the other hand, I am thoroughly convinced, in the development of this work, that an enormous amount of harm is going to be done, and on that account I would make this statement, that we must accept to-day the fact that the common, rational treatment of hypertrophy of the prostate is still the use of the catheter. And that point must not be lost sight of in this discussion. Many prominent men of great value to the community have hypertrophied prostates. I recall the case of a prominent bank president concerning whom I was talking with one of our prominent physicians yesterday. He is rather young to have an enlarged prostate, namely, about sixty years of age. I was much surprised, when he came to consult me in reference to his enlarged prostate, to find that he had been using a catheter for at least eight years. That man is and has been of enormous value to the community, and, aside from the nuisance of using the catheter, he is very comfortable. I cite this case simply as a note of warning, and I would like very much to see the point emphasized that, at present at least, the normal treatment that is to be advocated in the great majority of cases of enlarged prostate is still the use of the catheter and keeping the bladder sweet and clean by means of irrigation, and that the operative treatment is still on trial.

DR. F. A. DUNSMOOR, of Minneapolis, Minn.: In the first place, I wish to say that from my reading of this subject I regard some of these papers as classics.

Regarding the note of warning given by Dr. Bevan, it seems to bear the same relation to this surgical work on the enlarged prostate as does the truss for hernia. I believe the indications which are given are that the catheter should be used, and that the urine should be rendered sterile as well as the bladder. I do not think that it is the intention of the gentlemen who have read the papers in this symposium to say that an operation should be undertaken immediately or on the second day after they have seen these patients, and because they happen to have enlarged prostates. We meet with cases of infected bladders, with cystitis, and an accompanying disease which may involve the urethra and extend to the bladder, and all these things have to be considered before any operation is undertaken.

With reference to the prognosis and treatment, Dr. Bevan

mentioned the case of a bank president whom he said was getting along fairly well by using the catheter. I happen to know of a physician who is using his catheter, and has been doing so for the last fifteen years. I actually believe that if the necessary preparations had been made and an operation performed on him fifteen years ago, instead of being a man who looks apparently to be ninety years of age, he would look like a man of sixty. The bank president, to whom Dr. Bevan referred, at the end of two or three years may develop a pyelitis and die. If he was properly prepared, operated on, and cured, there is no good reason why he should not live to attain his ninetieth year.

DR. G. FRANK LYDSTON, of Chicago (by invitation): I did not expect to be called upon to discuss this symposium on prostatic hypertrophy, but after listening to Dr. Bevan I cannot refrain from saying a few words.

Dr. Bevan mentioned the swallow that makes his surgical summer in the prostatic region by mentioning a patient who had used the catheter for eight years, and who is sixty years of age. I would ask him what he considers the average duration of catheter life after it begins?

DR. BEVAN: I frankly confess, I cannot answer that question.

DR. LYDSTON (resuming): I believe Reginald Harrison states that it is about four years. I am going to ask Dr. Bevan another question, namely, When and where the prostatique's danger begins? I maintain that it begins with the introduction of the catheter, or that his danger begins when he first visits the surgeon.

DR. BEVAN: I do not think so.

DR. LYDSTON (resuming): Then, your experience differs from any general or genito-urinary surgeon. There are one or two things that have been overlooked in the discussion of this subject, and one in particular is the patient. That is obvious. It would seem that some of the essayists have a particular operation to exploit, and in so doing have forgotten the patient. Various methods of operating upon the prostate have been exploited, particularly the Bottini operation, which necessarily implies that if the results of those who report their cases are to be believed, the entire morbid anatomy and pathology have been changed since the introduction of that particular operation. The point has not been brought out in the discussion or in the papers, that there are certain conditions at the time the patient submits to operation which militate, in a large proportion of cases, against a successful result from any operative procedure. I do not believe the Bottini operation, or the operation of prostatectomy or prostatotomy changes certain secondary developments at the time the patient submits to operation. The fault is not with prostatectomy; it is with the profession, and will continue, if dominated by such conservative ideas as have been expressed by Dr. Bevan to-day. In our surgical work upon the prostate, complicated or otherwise, we should not adhere strictly to any particular operation, but select that method which we think is applicable to the

individual cases. The earlier prostatic hypertrophy is detected and operated on, the better. Nobody is reproached for operating on an ovarian tumor early. In prostatic surgery things are entirely reversed. Patients submit to operation when nothing else will do them any good. Their condition is so bad or desperate that they cannot get along without operation. Prostatic surgery, therefore, has not had a fair chance. The point I want to impress is that prostatic disease occurs very much earlier in life than is ordinarily supposed. The symptoms begin at a certain time, and sooner or later the patient presents himself to the physician with retention. But his condition may have continued for a long time and his symptoms have become so aggravated that he now demands surgical intervention. I believe the clinical history of these cases should be watched more carefully and closely, so that early diagnoses may be made and patients operated on more promptly. If the urine, bladder and kidneys are healthy, I see no good reason why radical operations on the prostate should not be performed, or, in fact, any operation about the bladder.

DR. FERGUSON (closing the discussion on his part): The subject has been so thoroughly gone over that I have very little to say. With reference to the incision, I made it in two cases, that is, the old Roux incision for the removal of the vesiculæ seminales, but I get better drainage in the median line by not making this semi-circular incision.

I think the time to operate on a case of enlarged prostate is when the patient has used the catheter, or when the surgeon has to catheterize him. That is the time to operate on these cases. I agree with Dr. Lydston in that respect. The last of the cases (I have done six within the last year and a half) I did through a perineal incision. They were all difficult cases, with the exception of four, where simply the so-called pathological lobe was involved, and I have been able to remove the large projections into the bladder through a perineal incision by this simple device and the retractors I have mentioned. I am going to continue to do this operation until I fail. If I should fail at any time, then I will either resort to the incision recommended by Guiteras, going down to the bladder, and pressing down with the fingers, or cutting into the bladder and using the finger from above. I would like to see the case in which I cannot remove the enlarged prostate through a perineal incision.

I must correct one of the gentlemen for calling the prostatotome a curette. It bites out quite sharply anything you desire. The objection to Syms' retractor has been mentioned, and in my paper I drew attention to it. He uses an inflated rubber bag inside of the bladder, and pulls upon it firmly. In six cases there was incontinence of urine in two. One of them had permanent incontinence of urine due to stretching of the neck of the bladder. He cuts through the membranous portion of the urethra. Dr. Mayo mentioned the point that a perineal incision would be suitable for some of the cases mentioned. One of my patients weighed two hundred and fifty pounds, and I would like to

direct attention to the fact that there is not much fat in the perineum of a fat man.

I regret that Dr. Murphy did not report his six cases done by this method with the aid of the staff, as well as Dr. Andrews and two or three others I could mention.

DR. BERNAYS (closing the discussion on his part): I do not think I have anything to add. I believe in the future we will have early operation, and it will be myomectomy.

DR. MAYO (closing the discussion on his part): One of the essayists spoke of "the best method," that is, figuring there will be but one method practically for all cases. I do not think there are too many methods now, and that progress in this line will be a choice of operation to suit the particular case in hand.

Another question that was discussed was that of suprapubic drainage. Theoretically, such drainage would look bad, but practically, we know it is a success, just as we drain, after the removal of a pus tube, through a suprapubic incision, the cul-de-sac of Douglas, the intra-abdominal pressure assisting drainage.

One of the features that has rendered suprapubic operations on the bladder unsatisfactory has been the fixation of the bladder. The one fixed point for the bladder should be its base. The prostate and its concentric muscle fibres are like the stomach, they contract. If we suture the bladder to the top, we have two points of fixation, and patients complain during urination and they have some residual urine. If the Witzel method is used of closing the bladder wall over the tube, allowing it to drop down, it would assume its ordinary condition.

DR. SCHMIDT (closing the discussion): The earlier we perform these operations, the better. As far as the choice of operation is concerned, it should be selected by the individual operator.

I must disagree with Dr. Bernays as to the pathology of prostatic hypertrophy. His idea that these hypertrophies are analogous to myomas of the uterus has been exploded for a great many years, and I am positive that a large percentage of recent investigations will not bear out his statement in this regard, because there is practically no analogy between myomas of the uterus and myomas of the prostate.

NEW METHOD OF ANCHORING THE KIDNEY—A PRELIMINARY REPORT.

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If a multiplicity of methods is an indication of unsatisfactory results, nephropexy must be the least satisfactory operation known to the surgeon. Dozens of methods have been exploited, each with a claim of superiority, but all based on four cardinal principles.

1. In April, 1881, Hahn reported his first cases of nephrorraphy for movable kidney. The sutures were passed through the fibrous capsule proper, the kidney being fastened to the edges of the deeper structures of the lumbar wound. Many slight modifications of this method have been made, but the principle of all has been the same as that originally used by Professor Hahn.

2. The method of decortication. Tuffier was the first to practice this method. He dissects off a portion of the posterior surface and convex border of the proper capsule of the kidney, and the organ is held into the wound by sutures, thus obtaining direct union between the deep muscles and fascia and the parenchyma. Jacobson modified this operation by dissecting off a flap of the fibrous capsule and stitching it to the lumbar fascia and muscles. Others make a double flap of proper capsule and suture each flap to the respective wound edges.

3. Senn's ingenious method, by which the kidney is held in position by a sling of gauze about the upper and lower poles, and the whole wound allowed to heal

by granulations, is now one of the recognized principles of treatment of this troublesome disease.

4. Vulliet's method of making use of a strip from the tendon of the erector spinæ muscle to underrun the fibrous capsule, the free end of the strip of tendon being then attached to the muscle, illustrates a fourth principle in the treatment.

DISAPPOINTMENT FROM ALL METHODS.

Surgeons have been much disappointed in the results of all these methods. Relapses are frequent and the more carefully one follows up the after history of his cases, the less confidence he is likely to have in his results. I know of some of my cases that have relapsed and have been impressed with the number of cases that have come to me with freely movable kidneys and bearing the scar of a previous operation done by well-known skillful surgeons. The adhesions between the true capsule and the lumbar structures are not likely to be firm. They become stretched in time and the kidney is likely to become as movable as before. The same may be said of the Senn method. No matter how firmly the kidney is held in place by the cicatricial tissue at first, we all know the later history of cicatricial tissue and there is no reason to suppose that in this region it will behave in any different manner than usual. All know the fate of large numbers who were subjected to the McBurney operation for hernia a few years ago, the plug of cicatricial tissue acting well for a time, but finally softening and stretching, allowing relapse of the hernia. Another theoretical objection to the Senn method is the effect of so much scar tissue upon so delicate an organ as the kidney.

Flaps of the true capsule stitched into the wound

have appealed to me as being the best of the tried methods. But even here we have to trust to the adhesion between capsule and wound structures remaining intact without stretching. Results show that even after this operation there are frequent relapses.

NEW METHOD BY MUSCULAR ATTACHMENT.

The use of a tendon of the erector spinæ appeals to me as better than the others described, except that it is difficult of execution and there is a question whether the free end will remain firmly fixed to the muscles. The method I wish to propose can best be explained by a report of the only operation yet done.

A. J., an unmarried female, aged 21, has frequent gastric crises and constant lumbar pain, especially on the right side. She lost 25 pounds in weight during the past year and is very anxious for relief. On examination, the right kidney is found freely movable, falling so low that the upper pole can be felt on bimanual examination. The left kidney is also somewhat movable. She entered Immanuel Hospital November 9, 1901, and an operation was performed on the right side November 11.

The incision extended from the lower rib to near the crest of the ilium, a hand's breadth to the right of the spinous processes of the vertebræ. The fatty capsule was reached just anterior to the outer border of the quadratus lumborum and was opened and a large part of it trimmed away. The kidney was pushed into place by a cylindrical pad placed under the abdomen.

DETAILS OF THE PROCEDURE.

When the kidney was well exposed, an incision was made through the proper capsule from two cm. be-

low the upper pole to a point two cm. above the lower pole. This incision was placed vertically on the posterior surface near the convex border. The capsule was stripped loose from the kidney substance for a distance of three-fourths of an inch anteriorly and posteriorly to the incision in the capsule. From the upper and lower extremities of the vertical incision a perpendicular incision three-fourths of an inch long was made through the capsule, this giving two flaps of capsule three-fourths of an inch wide by about two and one-half inches long.

Next a strip—the thickness of a little finger—of the outer border of the quadratus lumborum muscle was split from the remainder of the muscle, the fibres being separated by the handle of the scalpel. This separation extended from the muscular attachment to the twelfth rib downward for two and one-half inches, or the slip in the muscle was made as long as the length of the capsular flaps before described.

An artery forceps was passed through the slit in the muscle, made to grasp the free border of the posterior flap of the kidney capsule and then withdrawn, bringing the flap of the kidney capsule through the slit in the muscle. The two capsular flaps were next brought together over the bundle of muscular fibres thus isolated from the border of the quadratus lumborum, and stitched together with a running suture of fine chromicized catgut, the needle being allowed to penetrate the muscular bundle at two or three places. The lumbar wound was next closed by tier sutures of catgut, the skin wound being closed with horse-hair. Aside from a slight infection, the wound did well.

The patient never had a temperature above 99⅖°, was up on the twenty-second day and the kidney thus far

is in place and the patient freed of her former symptoms. It is, of course, too early to predict the final results.

This method is reported because it seems to me to represent a new principle in treatment. We have here a portion of muscle which can not become loosened from the kidney, and which continues its own physiological function. I can see no way of the kidney thus anchored becoming loosened.

It has occurred to me that possibly the contraction of the muscle may give rise to pain or inconvenience. Inasmuch as by all the older methods the effort has been made to effect as close an organic union as possible between the kidney and the deep lumbar muscles and fascia, and the more close the union the better the results were considered, I can see no objection to the method here proposed.

After writing the above, I found in the New York Medical Journal of December 7, 1901, a short article by Carl Beck, New York, "On a New Principle in Nephropexy," which I take the liberty of quoting: "The principle of this—as it seems to me—new procedure consists in suspending the kidney after having buttonholed it, on the fibres of the nearest muscle. I may be permitted to give the following preliminary report: In a woman of 24, the right movable kidney, after being exposed by a lumbar incision, was perforated near its lower pole by a trocar of moderately large size, a procedure which caused but little hemorrhage. The margin of the spinalis dorsi muscle was incised then and a bunch of fibres, just large enough to pass the renal buttonhole, mobilized. By a Pean forceps, this band-like muscular flap was drawn through the renal hole made by the trocar. Then the end of the

flap was fastened somewhat below its former muscular bed by iodoform-silk sutures. Thus the kidney was held in situ only by living tissue. There was no reaction and the operation seems to be a success."

The principle of this method is the same as my own, an effort to hold the kidney in its fixed position by living muscular tissue. But in my method there is, first, not so much traumatism to the kidney substance as in Beck's; second, in my method the muscular fibres are none of them cut, but remain intact and able to perform their functions as before.

NOTE.—A few weeks after reading this article, a reprint fell into my hands of an article published in the Medical Record, by Dr. J. F. Baldwin. He has devised a method almost exactly similar to my own; and, as he has the priority I wish to make this acknowledgment at this time. I had entirely overlooked his work in this line. A private letter from Dr. Baldwin shows an enthusiasm concerning the efficiency of the method which my additional experience causes me to share. Since the paper was written I have operated on five more cases and cannot speak too highly of the ease of the operation or of the satisfactory immediate results. —B. B. D.

DISCUSSION.

DR. HENRY T. BYFORD, of Chicago: Mr. President—I wish to say a word or two from what might be called the other side of the question. I have anchored a few kidneys, but it is a long time since I have found a patient with a kidney, floating or movable, whose symptoms could not be relieved otherwise. I think, ordinarily, a prolapse or a descent of the kidney is part of a general enteroptosis, and the causes are not removed when we anchor the kidney, and the symptoms are not always dependent upon the kidney, even though they may be relieved sometimes by anchoring the kidney. I think it is not always justifiable to anchor the kidney even in those cases, because, without doing it, we can allay the symptoms. In many patients the kidney may be too low

down. In others it may be decidedly enlarged in some way by disease, which can be detected by determining the nature of the inflammatory disease of the kidney, or tuberculosis, or any pathological condition. In some of those cases the patients did not know the kidney was causing the symptoms, and I have relieved them in nearly all cases. I think movable or floating kidney is sometimes connected with a narrowing of the ribs; there is not room for all the organs above that belong there, the liver, kidney, spleen, stomach, etc. There is not room in the upper part of the abdomen for these organs, and some one of them has to come down. The kidney comes down rather easily, and when it gets down, it is perhaps more comfortable for the patient than when it is up. Even though one may stitch it up, he cannot put it in a normal position, and the only thing that is gained is the prevention of abnormal mobility. If women will wear loose corsets without steels, to support their waists, supporting them from the shoulders and the abdominal contents by a bandage applied low down, pushing the parts up more or less as we do after a laparotomy, if they can keep the parts in a good resisting condition, they will not feel pain in every part they happen to think of. They will cease to complain and get along comfortably.

I also have an objection to tearing, loosening, or suturing the capsule of a healthy kidney unless it is absolutely essential. I do not know whether any bad results come from it or not, but I am inclined to think that we have not gotten far enough along yet to do this, although the principle of this operation outlined by Dr. Davis is a good one, and I would recommend it. However, I would call attention to the fact that although a large proportion of women have prolapsed kidneys, it is seldom that it is necessary to do anything whatever, and even this operation should be one of great rarity, and no man should have from fifty to one hundred cases of fixation of movable kidneys on his records.

DR. M. L. HARRIS, of Chicago: All of us admit that a large majority of cases of movable kidney do not require operation. We must, however, admit that occasionally we find a case in which the symptoms are directly due to the mobility of the kidney, and an operation which will restrain that mobility will relieve the patient of the symptoms.

The cause of movable kidney I attempted to demonstrate nearly a year ago before the American Surgical Association, and endeavored to prove that movable kidneys are due to a constriction of the middle zone of the body, and this point having been demonstrated, it proves the next point, which is that all attempts to restore the kidney to what is usually called its normal position are wrong, because the kidney then immediately becomes subjected to the influences which caused the mobility in the first place, and the kidney is almost certain to become again movable, for the reason that the same influences are brought to bear which caused its mobility originally. The symptoms of movable kidney are not due to the fact that the kidney is down. It is immaterial where the kidney is located, provided there be no ob-

struction to the flow of blood to or from the kidney, or the escape of urine from it.

The reasons we get symptoms from movable kidney are: During its mobility the circulation is interfered with or the escape of urine from the ureters is interfered with, or from its intimate connection with the duodenum, the duodenum is pressed upon or kinked. Any operation which has for its object the restraining of the range of motion or mobility of the kidney and places the kidney in such a position that its circulation to and fro is free, and where escape of urine from the ureter is free,—if these points be attended to, the symptoms which are due to the movable kidney will certainly be relieved. If these conditions are not complied with, the symptoms produced by the movable kidney will not be relieved.

The operation which Dr. Davis has described varies so slightly from the one which I did several years ago, that there is no material difference between the two. At one time I operated in exactly the same manner as Dr. Davis did, and the two flaps were turned down from the quadratus lumborum muscle. As this operation has been evolved, I think we can now state as an established fact, that any operation which decorticates the kidney, or any operation which fixes the kidney by direct suture, or any operation which passes a suture through the kidney is wrong in principle and will not survive. It has been demonstrated pathologically by the examination of specimens in cases in which the kidney has become decorticated, that there invariably occurs interstitial nephritis over the entire area decorticated. Of course the extent of the nephritis varies in different cases. There is also a nephritis set up about every suture which is passed through the kidney substance. If this suture be insoluble, the amount of inflammation is infinitely greater than in the presence of a suture which is quickly absorbed.

DR. ALEXANDER HUGH FERGUSON, of Chicago: There is one point I would like to lay a little stress on, and that is a consideration of the condition of the kidney that is movable. We get kidneys that are normal and that are floating; we get other kidneys that are half normal, so to speak. Those kidneys are constantly tender, the patients having one attack of pain after another, simulating chronic appendicitis. The attacks recur, and the kidneys are floating. Those are the cases of interstitial nephritis. The treatment for suspending such a kidney is different from that of suspending a normal kidney. A normal kidney may have ascended, and on account of a twist, or probably on account of stretching, there is pain, but there is no pain when the kidney is in place. By palpation of the kidney repeatedly before operation is done, and by examination of the urine, very often we will find the kidney is pathological. Sometimes we find the kidney is pathological when there are no casts or albumin in the urine. This has been pointed out by internal medical men not long ago. When we have a kidney that is movable, and that has nothing the matter with it, the treatment

for that kidney is not to peel off the capsule, not to put any stitches through it. You can stitch it on to the capsule or perform the plastic operation recommended by Dr. Davis and Dr. Harris. I perform a similar operation, stripping off the fascia around the kidney and fastening it there. It does not take much to hold a kidney in place, provided you prepare for its place. You must pay attention to the strip of peritoneum attached to the kidney. It becomes a regular ligament, so to speak, and where there is a descent of the intestines, there is a constant dragging on account of the peritoneal attachment; I liberate the peritoneal attachment, let the kidney be free in the loin, and get rid of the attachment.

The next point is with reference to the fat. I do not remove the fat. I take all fat around the kidney, put it all below, and make a nice pad of it with which to support the kidney. It does not require much stitching or hardly any, as this operation proves. If I have a kidney that is tender, with repeated attacks of pain, it needs treatment, and the best thing to do in such a case is to strip off the capsule which binds down such a kidney, and separate the adhesions, besides puncturing the kidney in several places. Should there be pus in the urine, drain the pelvis of the kidney in that direction. The capsule can be sutured in the lumbar wound.

DR. R. HARVEY REED, of Rock Springs, Wyo.: Just a word or two before the discussion is closed on these papers. This subject has interested me more or less for some time. While I admire the peroration of Dr. Davis, and while I believe his operation may be successful, yet, at the same time, I take the same position that I have taken with regard to all lumbar operations in kidney cases, that they are bulky, cumbersome, and difficult, without good results, as we should have for the amount of enucleation that takes place. In operating for a floating or movable kidney through the lumbar region we meet with difficulty in getting the kidney up into its place and holding it there until we finish the operation. I have seen the best of operators operate in this country, and I have seen them encounter a great deal of difficulty in catching the kidney and putting it in its place and holding it in position in which they desired it.

The operation which I have advocated for some time consists in opening the abdomen in front, pushing the kidney up into place, taking two needles threaded with one thread, and passing it through the kidney just above the twelfth rib, and making a suitable stitch such as I will represent in a moment on the blackboard. (Here Dr. Reed went to the blackboard.) Let us suppose this to be the kidney on the right side; the ureter comes out and down in this direction (indicating). The operation which I have advocated for this trouble is to pass a needle through at this point (indicating) immediately above the twelfth rib; another at that point (indicating), about an inch apart, and carry that right through and tie it on the back. I take a silkworm gut suture, tie it on the back, put my finger underneath there,

and as the assistant pulls it down, you can feel the tension you require and keep the bowels from out under without any trouble whatever. The operation is done in a short time. I know patients who were operated upon by this method seven years ago who are certainly perfectly normal to-day. I recall one patient upon whom I made a second operation, not for floating kidney, but for the removal of an ovary. I made an examination at the time to determine the efficiency of the kidney, and found it to be healthy, and as far as I could judge, from manipulation, was in place and solid, showing that the operation was successful. It has been contended that by this method the kidney may not be held in place, but my experience has been that it gives better leverage and adhesive surface than in the ordinary operation where we simply hold the kidney from one side. I have made a little improvement on this operation. I put a stitch in below the kidney at this point (indicating) in which I have sutured through, and draw the peritoneum down upon the muscles of the back, then make a fatty cushion below which supports the kidney. I do the same thing by stitching through here (indicating), tying it on the back. After the stitches have been allowed to remain ten days or two weeks, they are cut on the outside and pulled through, and the kidney left without any sutures about it. So far, there has been no injury done to the ureter.

DR. H. P. HAMILTON, of Omaha, Neb.: Just a few words in regard to these papers. Both of the operations that have been described are excellent ones, and perhaps will give as good results and be attended with as great a success as any other operations that have been adopted. I believe the one thing that effects a cure in these cases has not been spoken of, and that is the rest the patient receives during the time he or she is recovering from the operation. I believe that the attachment or attachments that we get from any operative procedure will not cure a single case, were it not for the change that takes place in the normal movement of the other viscera during the time the patients are resting in bed on their backs. This is the secret of our success. Were it not for the fact that it requires eight or ten weeks for a patient to recover from these operations, I believe we would have more successes than we do have. The operation described of catching the fat of the part to hold up the weight of the kidney we all understand. If we attach the fat of the posterior part and allow the weight of the kidney on the part, the slightest amount of jarring will tear it loose. If we raise a portion of the capsule of the kidney, and pass under that portion muscular tissue, we understand what will take place there. Malignancy will occur in a short time. If it is muscular tissue, a change will take place; it will become fibrous tissue; the muscle will not remain there. Irritation caused by the band of the capsule over the muscle will produce a change in the part, so that it will become a ligament. We know the attachment of the capsule of the kidney is not sufficiently great to prevent the weight of the kidney from tearing the capsule loose. In other words, it

would tear out the part, were it not for the fact of the rest the patient gets during the three or four or five or six weeks she or he is kept in bed to restore the parts to their normal position.

DR. DAVIS (closing the discussion on his part): In my short paper, I merely wished to make a brief preliminary report on this operation, that is all, and did not enter into any discussion in regard to when this operation is indicated. With reference to the remarks of Dr. Byford, I do not think I have operated on but one case in fifteen out of the list of cases of movable kidney that have come to me. I feel that movable kidney in the great majority of cases is not a pathological condition; that we oftentimes will have a general gastro-enteroptosis, or a general abdominal ptosis, in which the kidney takes part with all other organs, and I do not think such an operation as this would be called for. I make it a regular practice in all my examinations of the pelvis or any part of the abdomen to do it carefully, and while I find in a large number of cases the kidney is movable, it gives absolutely no symptoms. In those cases I ask questions, never suggesting a movable kidney. In the majority of cases I do not get any response, and anyone would be foolish to operate on such patients for movable kidney. We have been told by men that splitting the fibers of the capsule of the kidney will give rise to interstitial nephritis. When we have interstitial nephritis we must split the capsule of the kidney to cure it.

As far as the pathology is concerned, we are a good deal at sea. This discussion has been rather pessimistic, and I do not wonder at it, and it is due to the fact, it seems to me, that so little benefit, as a rule, follows these different operations. If you have noticed the drawings that were passed around, you can hardly imagine that it is probable in a very large percentage of cases that the kidney will work itself loose. You have a slit in the muscle; I do not believe the muscle is going to become simply a prolapsed band, as has been said, because we do not destroy either attachment of the muscle. It is left there absolutely perfect; you split the quadratus lumborum muscle, not any of the fibrous tissue, but the whole muscle, and you have the same attachments, and that muscle will act in the same manner as before. If you have brought the fibrous capsule over and stitched it there and obtained firm union, there is no great liability to recurrence.

DR. ANDREWS (closing the discussion): I have not studied the method described by Dr. Davis sufficiently to speak of it, but it reminds me of an operation devised by Dr. L. L. McArthur, which consists in making a lumbar pocket for the kidney. A transverse cut is made through the lumbar fascia high enough up, so that a decided pocket is made and the kidney tucked half into it, and it is held there and prevented from falling down. He has reported some degree of success by this method.

INTESTINAL OBSTRUCTION FROM MECKEL'S DIVERTICULUM.

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C. L., aged 25 years, was admitted to the Cook County Hospital August 10, 1901. Shortly after admission, the following history was obtained: Family history, negative; past history, has had the usual diseases of childhood. At the age of 4 was confined to the bed for several days by an illness that was called inflammation of the bowels, and that was attributed, by the family physician, to a fall upon the abdomen. At this time the intestines were said to have been injured. Since the age of 4 years he has had several attacks of severe abdominal pain associated with obstinate constipation and vomiting. The last attack, which occurred about two and one-half years ago, was the most severe. At this time he was confined to the house for one week.

Present Illness.—This began two days before admission. While at breakfast, he was suddenly seized with intense abdominal pain, colicky in character, and distributed over the whole abdomen. Shortly after the onset of the attack, he vomited. The pain has since that time increased in severity. The abdomen has become more and more distended and more sensitive to pressure. All efforts towards securing a movement of the bowels have been unsuccessful. No gas has escaped from the bowels. The vomiting has continued at intervals of about two hours since the beginning of the attack. The matter vomited has not changed in

character, remaining free from fecal odor and consisting of a semitransparent, slightly bile-stained fluid.

Examination shows a well-nourished, vigorous appearing young man, with no evidence of congenital deformity. The face is rather drawn and has an anxious expression. Lungs and heart negative. The abdomen is distended somewhat more above the umbilicus than in the lower half, and perhaps a trifle more in the right than in the left side. On percussion, there is a uniform, tympanitic note. No dullness in any part. Liver dullness present, but displaced slightly upward. Palpation shows the abdomen to be somewhat sensitive to pressure, the most painful part being the right side, just above the anterior superior spine of the ileum. No peristaltic movements visible, no evidences of external hernia. Rectal examination negative.

During the afternoon of the day of admission, the patient continued to vomit and his pain increased. High rectal enemata were given, but failed to bring away any gas or fecal matter. When admitted at 10 o'clock a. m., his pulse was 102 and his temperature 100° F. At 8 p. m., the pulse was 114 and the temperature 101.2° F. At 11 p. m., the pulse was 120 and the temperature 103° F. The vomiting had become more frequent and the pain had steadily increased in severity.

Operation at 12, midnight. After taking into consideration a history of repeated attacks and the character of the symptoms, a diagnosis was made of obstruction, either from a congenital band or from adhesions resulting from an old appendicitis. An incision was accordingly made to the outer edge of the right rectus muscle, about on a level with the umbili-

cus. As soon as the peritoneal cavity was opened, a loop of distended intestine was seen. This was pulled out and traced downward for about eighteen inches, when there was found a constricting ring. Immediately below this the intestine was collapsed. On close inspection, the ring was found to be made up of a Meckel's diverticulum, to the distal end of which was attached a fibrous cord. The diverticulum was somewhat larger than the ileum, from which it originated, and was about two and a quarter inches in length. The terminal ligament measured about three inches, and was continuous with the root of the mesentery, a short distance below the point of origin of the diverticulum. The diverticular ligament contained a blood-vessel, apparently a vein, which was filled with blood, and which seemed to communicate with the mesenteric vein. The diverticulum and ligament together formed a ring through which a loop of intestine had passed and was strangulated. No volvulus. The diverticulum was given off about fifty centimeters from the ileocecal valve. The part of the intestine forming the loop which passed through the ring was the ileum, below the point of origin of the diverticulum. The terminal ligament was ligated close to the mesentery and divided; gas immediately passed into the collapsed gut, and through the ileocecal valve. The diverticulum was amputated close to the margin of the gut, leaving a longitudinal opening two inches in length in its convex side. This was closed by the Connell through-and-through suture of silk. The bowel was restored to the abdominal cavity and the abdomen closed. There was no fluid in the peritoneal cavity. The intestine was red, injected, and edematous, but the peritoneal gloss was not lost, and there was no

evidence of any serious nutritional change in the bowel. The day following the operation the bowels moved freely, and recovery was uninterrupted. The patient was discharged recovered on September 7, 1901.

The malformation generally known as Meckel's diverticulum was described first by Ruysch.[1] Its congenital nature was also considered by him. The origin of this structure from the vitelline duct was pointed out by Morgagni.[2] Meckel,[3] although crediting the early writers with possessing a knowledge of this diverticulum, claimed to be first to explain its origin and to call attention to its presence as a frequent cause of disease. The origin of Meckel's diverticulum may be briefly explained as follows:

About the end of the third week of fetal life in the human embryo, the primitive intestine communicates with the umbilical vesical by means of a tube, the omphalomesenteric duct. During the process of closure of the abdominal parietes, which takes place during the fourth and fifth week, this disappears, excepting a thread-like remnant, which passes from the convex border of the loop of the ileum nearest the umbilicus to the umbilicus or the abdominal wall near by. This thread-like structure usually disappears as the development of the intestine progresses. Most of the growth takes place above the attachment of this cord. This forms the greater part of the small intestine. The portion below forms the remaining part of the small intestine and the large intestine. When the developmental change in the vitelline duct is not completed, there remains a tube or cord, more or less permanently attached to the umbilicus. When a diverticulum exists in its most perfect form, it consists of a tube similar in structure to the small intestine, of

varying length, and attached to the umbilicus. In these cases a congenital, umbilical, fecal fistula usually exists. This may or may not close spontaneously after birth. In a case cited by Treves,[4] the ubilical fistula appeared first when the child was three weeks old, and persisted for seven years, and then closed spontaneously. In other cases, the tube ends in a blind extremity, and either hangs free in the abdominal cavity or is attached to the umbilicus or mesentery, or some other abdominal organ, by a fibrous band called the terminal ligament. In many cases the cord breaks from its attachment to the umbilicus and hangs free in the peritoneal cavity. It seldom attaches itself to other structures. The origin of this terminal ligament is the persistence in a varying state of atrophy of the vessels that accompany the vitelline duct. These are the omphalomesenteric artery and vein. During the atrophy of the vitelline duct, these arteries and veins usually disappear, but atrophy of the duct is not necessarily accompanied by disappearance of these vessels. The existence of the omphalomesenteric vascular remains was well known to Meckel,[3] and their transformation into a fibrous band which might prove a serious menace to life was likewise appreciated by him. In his classification of internal hernia, he mentions, as one of the causes of strangulation, the "presence at the summit of a loop, a diverticulum of the ileum, with a filament, the remains of the omphalomesenteric vessels, which may become attached and be the cause of obstruction." For many years, explanation of the origin of the terminal ligament, as given by Meckel, was apparently not accepted or not known. In most of the earlier cases reported, and, in fact, up to the time that Fitz[5] published his paper on "Per-

sistent Omphalomesenteric Remains," the fibrous cord, either hanging free from the distal end of the diverticulum or attached, was generally regarded as of inflammatory origin. It may be said that the existence of inflammatory adhesions between the diverticulum or its ligament and the neighboring organs rarely occurs, and but few authentic cases are found in the literature. Those in which it is said to have been attached to the mesentery by inflammatory adhesions are probably remains of omphalomesenteric vessels which retain their mesenteric attachment. The original points of attachment of these vessels were the intestines, the mesentery, and the umbilicus. Any one or two of these may be severed. Usually, we find the cord attached to the intestine or diverticulum, and, by its distal end, to the umbilicus or mesentery. In a case reported to the author by Dr. Henrotin, the terminal ligament of a diverticulum had become adherent to an inflammatory exudate about the stump of the appendix and caused obstruction about eight days after an operation for appendicitis. It is a well recognized fact that attached diverticula are more often the cause of obstruction than those that are free or unattached. The relative frequency of the points of attachment of the distal end of a Meckel's diverticulum or its terminal ligament is of interest as bearing upon the treatment of this form of obstruction. Treves[4] quotes Cazin's statistics in twenty-three reported cases in which he found the distal end attached to the umbilicus in three, to the small intestine in six, to the mesentery in ten, to the cecum in two, to the inguinal ring in one, and the colon in one. In twenty cases collected by himself, he found diverticula attached near the umbilicus in seven, to the mesentery in seven,

to the bladder in one, the femoral ring in one, the small intestine and cecum in one. Kammerer,[6] taking the cases of Neumann[7] and those of Boldt[8] not included in Neumann's list, together with ten cases that he collected, found that of the sixty-six cases, thirty-three were attached to the mesentery, thirteen to the umbilicus, and twelve were attached to some part of the intestinal tract or to other abdominal viscera.

Of the sixty-nine cases reviewed by the author, there are forty-eight in which the attachment was noted. Of these, twenty-three were attached to the mesentery and fifteen to the umbilicus. The attachment to other abdominal organs was, to the small intestine, three; to the omentum, one; to the transverse mesocolon, one; to mesorectum, one; to peri-appendicular exudate, one. In three the exact point of attachment could not be determined. The attachment to points other than the mesentery and umbilicus is of slight importance to the surgeon, because it is probably due to inflammatory adhesions, and therefore accidental, and for this reason no estimate can be made of the relative frequency with which it may occur.

It is generally stated that Meckel's diverticulum, or at least some omphalomesenteric remains, are found in from 1.25 to 2.5 per cent. of all bodies examined. The latest statistics relative to the frequency of this anomaly are those of Kelynack.[9] He found it present eighteen times in 1,446 post-mortem examinations. Of these, eleven were males and seven females. In none did its presence bear any causal relation to death. He therefore concludes that it is of slight practical importance. In 3,400 examinations in St. Bartholomew's Hospital, there were twenty-seven in which Meckel's diverticulum was found, making about one in every 126 bodies.

The frequency of intestinal obstruction from Meckel's diverticulum is difficult to state, as the statistics bearing on this point are of comparatively little value. In many of the recorded cases, accurate examination of the exact anatomical conditions have not been made, so that in not a few there is doubt as to the existence of a true Meckel's diverticulum. Most of the reports show that there is a general lack of knowledge concerning this important developmental defect.

The older statistics are particularly misleading, in that the appendix was frequently confused with the true Meckel's diverticulum. Bands, undoubtedly remains of omphalomesenteric structures, were even up to recent years generally regarded as inflammatory in origin. Taking the cases reviewed by Leichterstern,[10] we find that in 1,134 cases of intestinal obstruction, 39 per cent. were due to intussusception, 9 per cent. to bands and adhesions, and 6 per cent. to diverticula. Of the combined cases collected by Haven,[11] Duchanssoy,[12] and Brinton,[13] making in all 991, in about 6 per cent. Meckel's diverticulum was the cause of obstruction. These figures, though far from accurate, undoubtedly show that obstruction from Meckel's diverticulum is relatively common, and probably occupies the place next to intussusception as the cause of intestinal obstruction.

The manner in which the intestine may become obstructed in a Meckel's diverticulum is of great importance to the surgeon. A thorough knowledge of the possibilities in any individual case will often permit him to give prompt relief by directing him at once to the seat of obstruction, which might, under the opposite conditions, be overlooked. In reviewing the reports of cases operated upon, we often find that,

after the abdomen has been opened, the cause of obstruction could not be found, and was only discovered at the autopsy. The post-mortem reports of these cases fully demonstrate, in many instances, that the operator lacked knowledge of the anatomical peculiarities of this region.

In considering the ways in which Meckel's diverticulum may cause obstruction, we can separate the cases into two groups: (1) Those in which the obstruction is produced by a free or unattached diverticulum, that is, having only one attachment to the intestine; (2) those in which the diverticulum or its terminal ligament is attached to the abdominal wall or to some viscus.

Intestinal obstruction from a non-attached Meckel's diverticulum is comparatively rare. When it occurs, the obstruction is brought about in one of the following ways:

First. The gut, usually the ileum, is snared by a noose, or a knot of more or less complicated structure is tied about a loop of the gut. In some cases the free diverticulum in reality forms a volvulus with the loop of gut inside the twist. Adhesions commonly form, binding the two arms of the twisted and inflamed diverticulum together, and thus constrict the bowel. Such a mode of strangulation is pictured by Treves in his work on intestinal obstruction. (Fig. 14, p. 48.) In other cases, a complete knot is tied in the diverticulum, about a loop of intestine. In order that such a knot may be tied, Nothnagel[14] finds that certain peculiarities of the diverticulum must exist. (1) It must be of unusual length; (2) it must be pear-shaped, or, at least, have a knob-like distal extremity; (3) it must possess a great range of mobility. Such a case is

reported by Hohlbeck.[15] In this case the diverticulum was twenty-three centimeters long, and was considerably larger at the distal end than at its base. A loop of eighty centimeters of intestine was strangulated inside of a complete knot of the diverticulum. The gut was resected, and an end-to-end union by Murphy's button was followed by recovery. Double knots have also been found, according to Treves. None of these have been described in any of the cases reviewed by the author.

Second. Obstruction from kinking of the intestine at the point of attachment of a diverticulum may result from dragging of a loop of the intestine, by an unattached, distended, or cystic diverticulum, without any structural change occurring in the intestinal wall. If this traction and kinking are continued for any considerable time, necrosis of the gut at the acute angle formed usually occurs. An instance of this kind of obstruction is reported by Walzberge.[16] In his case, necrosis of the gut at the point of attachment of the diverticulum had already taken place. Acute flexion of the intestine occurs more frequently when the distal end of the diverticulum or its ligament is attached. When a free diverticulum is caused by kinking of the gut, it must be of good size and of considerable weight. Usually, it is found filled with fecal matter or concretion, or its lumen is obliterated at the point of attachment to the intestine, and its distal end has undergone cystic degeneration.

Third. Twisting of the bowel on its long axis at the point of origin of the diverticulum itself is a frequent cause of obstruction. In these cases, as in the preceding form, the diverticulum is usually large and distended, and necrosis of the bowel is common. In a

second case reported by Walzberge[16] this mode of obstruction was found post-mortem. The cause of obstruction was not determined at the time of operation. At the autopsy, a cystic diverticulum was found, the base of which was twisted until the lumen was completely obliterated. A portion of the wall of the intestine close to the insertion of the diverticulum was twisted and necrotic. A case of volvulus of the small intestine, caused by twisting of the diverticulum, which hung free in the pelvis, is reported by Good.[17] Another interesting case of obstruction, resulting from twisting and kinking of the intestine from an unattached diverticulum, has recently been reported by Taylor.[18] In this case the diverticulum was enormously distended and twisted three times at its base. The twisting and traction had caused obstruction at the point of origin of the diverticulum.

Fourth. Chronic inflammation of the diverticulum and of the adjacent portion of the intestine, with cicatricial narrowing of the gut just above the diverticulum, can be the cause of obstruction. This may happen in free and in attached diverticula. The diverticulum becomes filled with fecal matter or concretions, and the resulting inflammation extends to the intestine, ulceration and cicatrization follow, and obstruction finally develops. In some cases, congenital narrowing of the gut at this point may be the cause of obstruction. Some writers consider that in case of stenosis of the bowel, at or near a diverticulum, the condition is always congenital. Cases are on record, however, where the bowel was found in an ulcerated state at the time of death. In most of the cases where there is stenosis of the bowel, either congenital or inflammatory, the symptoms of chronic obstruction

antedate the acute strangulation. The latter develops when the bowel becomes occluded by fecal matter lodging at the constricted point.

Fifth. Inversion of the mucous membrane alone, or of the entire diverticulum, with or without invagination of the segment of the gut just below the diverticulum, is an occasional cause of obstruction. An interesting case is reported by Hohlbeck,[15] where, with an invagination of one-half foot in length of the ileum, the mucous membrane of the diverticulum was found completely separated from its muscular wall, excepting where it was continuous with the intestinal mucous membrane, and inverted into the lumen of the gut. This evidently had been the chief factor in the production of the intussusception. Treves[4] describes a specimen of invagination of a diverticulum of the ileum which is in the Guy's Hospital Museum. Küttner[19] collected seven cases from the literature, and reported one of his own. Stubenrauch[20] reports one, as does also de Quervain.[21] It may also be mentioned that inversion of the diverticulum may occur without producing any symptoms during life. Heller[22] found one post-mortem, which hung freely in the lumen of the gut without causing any disturbance. Obstruction from inversion of the diverticulum may be the result of mechanical hindrance to the fecal currents by the presence in the lumen of the gut, of the inverted diverticulum, or by the diverticulum being drawn down the intestinal canal by the fecal current, and by this traction causing an intussusception. Of the twelve cases reported belonging to this group, in eight intussusception was associated with inversion of the diverticulum; in four, inversion of the diverticulum alone was present.

The conditions essential in the development of an inversion or invagination of the diverticulum are that it must be of considerable size circumferentially, and that it must be free. Probably the starting-point of an invagination is when a concretion or a fecal mass is emptied from its lumen into the intestine. Separation of the mucous membrane, as in Hohlbeck's case, can also best be explained in this way.

Strangulation from an adherent diverticulum is more common than from one than hangs free in the abdominal cavity. The methods by which an attached diverticulum may produce strangulation of the gut are as follows:

First. By the diverticulum acting as a band, in the same manner as an adventitious band or a peritoneal adhesion would produce obstruction by constricting the lumen and interfering with the circulation in a loop of intestine that had passed underneath it. Treves considers it impossible for a diverticulum that is attached to the abdominal wall at the umbilicus, and thus stretched across the cavity, to produce obstruction in this way. Many cases of this kind are reported. The intestine is probably twisted around the diverticulum in some way, so that the twist constricts the gut rather than the band itself. When adherent to the mesentery, as is so frequently the case, it is easy to see how the gut may be obstructed by pressure of the diverticulum acting as a band. The same is true when, by secondary adhesions, it becomes attached to the same intra-abdominal organ close to the posterior abdominal wall. An interesting illustration of the diverticulum acting as a band is a case reported by Dr. McArthur,[23] where the Meckel's diverticulum attached to the root of the mesentery, close to the ileocecal

valve, constricted the appendix, causing necrosis of the appendix and obstruction of the intestine.

Second. Obstruction from an adherent diverticulum may occur by a loop of gut passing under it and becoming twisted on itself, and thus forming a volvulus. A case is reported by McKenzie[24] where a loop of gut five feet in length had passed beneath an adherent diverticulum and become twisted and strangulated. Symmonds[25] also reports a case of volvulus occurring under a diverticulum of large size which was adherent. The point of attachment was not determined.

Third. Volvulus of the attached diverticulum itself occasionally occurs, and is the cause of obstruction of the intestine. Carwardine[26] reports a case of volvulus of a Meckel's diverticulum which caused the death of a child three days old. The operation being unsuccessful in relieving strangulation, post-mortem examination revealed a diverticulum filled with meconium and twisted upon itself. The intestine was occluded at the point of origin of the diverticulum.

Fourth. Strangulation over a tensely-drawn diverticular band may under certain conditions take place. Treves illustrates this mode of strangulation of the intestine by comparing it to a coil of soft rubber tubing thrown over a tightly-drawn wire and allowing it to become dependent. The weight of the tube will cause acute flexion and consequent obstruction of the ileum. Treves refers to a case of Lasseau where a diverticular band extending from the intestine to the umbilicus caused obstruction in this way. The symptoms developed very rapidly, and death occurred in ten hours. The loop of intestine suspended from the diverticulum was necrotic.

Fifth. Occlusion by kinking due to traction happens much more frequently in attached diverticula than where the diverticulum is free. In most cases of this form of obstruction, the diverticulum is attached to the umbilicus. The intestine, by becoming overdistended either with fluids or gas, may so pull upon the anchored loop as to cause acute flexion and ultimate obstruction. Reignier,[27] experimenting with a loop of gut having a diverticulum seven centimeters in length, obtained from the body of an infant, found that, by gradually overdistending the gut with water, obstruction to the flow of water through the lumen occurred just below the diverticulum. In moderate distention, no obstruction was present. Obstruction from overdistention was due to the diverticulum becoming enormously dilated, and so pressing upon the gut just below as to produce acute flexion and, finally, complete obstruction.

Sixth. Obstruction from torsion of the diverticulum may occur when the diverticulum is attached, in the same way as when it hangs free. The same may be said of obstruction from chronic inflammation, or from congenital stenosis at the base of the diverticulum. Acute inflammation of the diverticulum—diverticulitis—may also act as a cause of obstruction in both attached and free diverticula.

Although in the majority of cases, when obstruction is caused by Meckel's diverticulum, the onset is sudden, yet in a few chronic obstruction exists for a long time before the acute forms develop. This is particularly true where stenosis of the bowel above the diverticulum exists. Traction of the bowel at the point of attachment of the diverticulum also favors narrowing of the lumen at that point. This finally leads to chronic obstruction.

Prolapse of the small intestine through an umbilical fecal fistula is at times the cause of obstruction. Alsberge[28] refers to a case of Hüttenhemer, where at the end of the third month fecal fistula was established during an attack of whooping-cough. The ileum prolapsed through the fistula, and death from obstruction followed. In the cases reviewed by the author, obstruction from prolapse of the intestine through an umbilical fistula, as well as those where obstruction from a Meckel's diverticulum was present in a hernial sac, have not been considered.

The importance of attempting in each case of obstruction to make a diagnosis of the variety of obstruction that exists, in order to facilitate intelligent operative treatment, cannot be overestimated. In any case of acute obstruction, the failure to determine with relative certainty the essential cause should not be considered a contraindication to prompt operative treatment, nor should such failure be used as an excuse for delaying the operation. Every case of obstruction is a case for operation. Of all forms of acute obstruction, none demand more energetic treatment than does that from a Meckel's diverticulum. In the great majority of cases the onset is sudden, and the symptoms are so characteristic of an acute obstruction that there can be no excuse for not offering prompt relief. It is true that only in a few cases, however, can we with any degree of certainty positively identify this form of obstruction before operation.

We have, as evidence of obstruction from a diverticulum, (1) The age of the patient; it usually occurs in children or in young adults; (2) the history of preceding minor attacks; (3) the configuration of the abdomen, which is that of an inverted cone; this being due

to obstruction of the upper part of the intestinal tract. The absence of distention of the flanks is conspicuous during the early hours of the attack. (4) Local meteorism, especially upon the right side of the abdomen, under the costal arch, with in the early stage, in a few cases, visible peristalsis, prevails. (5) Fecal vomiting, as a rule, comes on early; Cazin lays particular stress on its late appearance. The time when it appears depends, of course, upon the acuteness of the obstruction and the part of the gut strangulated. (6) Tenderness in the right side on a level, or just below the umbilicus. In looking over the cases reported in the last ten years, one is impressed with the frequency with which this form of obstruction has been mistaken for appendicitis. This is unavoidable where the diverticulum forms a cyst and is lodged in the right side of the abdomen, as in Taylor's case. In McArthur's case, the diverticulum was not only the cause of obstruction of the bowel, but also constricted the appendix and produced gangrenous appendicitis. When the diverticulum is attached to the umbilicus, Berard[29] lays great stress on the exquisite sensitiveness of the umbilical region. (7) The coincident occurrence of other malformations, such as club-foot, harelip, exstrophy of the bladder, is mentioned by nearly all writers as of importance in the diagnosis of obstruction from Meckel's diverticulum. In sixty-nine cases reviewed by the author, harelip was present in one case; in no other was congenital malformation present. From this we may conclude that the absence of these deformities constitutes but slight evidence that the diverticulum does not exist.

Concerning the mortality of obstruction from Meckel's diverticulum, we have the statistics of Boldt,[30] fifty-five cases reported, fifteen operated upon with

three recoveries. In a very comprehensive summary of this subject, Berard and Delore have tabulated thirty-two cases operated upon, with nine recoveries and twenty-three deaths, giving a mortality of about 72.3 per cent. Of the sixty-nine cases collected by the author, in sixty-six the termination is mentioned. Of these, forty-five died and twenty-one recovered, a mortality of 68.1 per cent. Of the sixty-nine cases, fifty-seven were operated upon, and of these the result is given in fifty-four, with twenty-two recoveries and thirty-two deaths, giving a mortality of 59 per cent. in the cases subjected to operative treatment.

No. 1.—*Operator*, Taylor: Johns Hopkins Bull., 1901. *Age and Sex*, 6, female. *Character of Symptoms*, several minor attacks; last, very sudden onset of classical symptoms of acute obstruction. *Mode of Strangulation*, cystic free; diverticulum twisted three times at base; traction produced acute flexion at point of attachment of diverticulum. *Treatment*, diverticulum removed. *Termination*, recovery.

No. 2.—*Operator*, Morton: The Lancet, vol. 2, 1900. *Age and Sex*, 9, female. *Character of Symptoms*, symptoms similar to those of acute appendicitis. *Mode of Strangulation*, kink in loop of ileum, which was caught under a diverticulum that was attached to umbilicus and acted as a band. *Treatment*, diverticulum removed; no resection of intestine. *Termination*, recovery.

No. 3.—*Operator*, Hall: The Lancet (London), vol. 1, 1900. *Age and Sex*, 3, male. *Character of Symptoms*, symptoms of obstruction lasting for four days; vomiting occasionally; abdominal distention; some pain; collapse on fourth day. *Mode of Strangulation*, diverticulum attached to mesentery; constriction of loop of ileum under this band. *Treatment*, diverticulum removed. *Termination* (?).

No. 4.—*Operator*, Hall: The Lancet (London), vol 1, 1900. *Age and Sex*, 5, male. *Character of Symptoms*, symptoms of acute obstruction by band. *Mode of Strangulation*, diverticulum attached to mesentery acted as band; loop of gut strangulated under this band. *Treatment*, diverticulum removed. *Termination*, recovery.

No. 5.—*Operator*, Sellers: The Lancet (London), 1900, vol.

1, p. 383. *Age and Sex*, 32, male. *Character of Symptoms*, symptoms of acute obstruction; vomiting, pain, and abdominal distention of five days' duration. *Mode of Strangulation*, diverticulum attached by terminal ligament to umbilicus; loop of ileum compressed by diverticulum and obstructed. *Treatment*, laparotomy. *Termination*, death twelve hours after operation.

No. 6.—*Operator*, Fawcett: The Lancet (London), vol. 1, 1900, p. 1585. *Age and Sex*, 11, female. *Character of Symptoms*, sudden onset of symptoms of acute obstruction; operation on third day. *Mode of Strangulation*, diverticulum one and a half inches long, with terminal ligament attached to "bowel"; coils of small intestine had slipped through ring thus formed. *Treatment*, laparotomy; diverticulum removed. *Termination*, recovery; no bowel resection.

No. 7.—*Operator*, Snow: Archives of Pediatrics, 1900, vol. 17, p. 501. *Age and Sex*, 3, male. *Character of Symptoms*, acute complete obstruction lasting four days, collapse. *Mode of Strangulation* (autopsy), diverticulum with ligament attached to mesentery close to ileocecal valve; loop of ileum below diverticulum compressed by diverticulum acting as band. *Treatment*, no operation. *Termination*, death.

No. 8.—*Operator*, Mackay: The Lancet (London), 1900, p. 1068. *Sex*, young female. *Character of Symptoms*, complete obstruction; severe pain; fecal vomiting; visible peristalsis; temperature normal. *Mode of Strangulation*, fibrous cord extending from ileum a short distance above ileocecal valve to transverse mesocolon on left side; knuckle of small gut compressed under this band. *Treatment*, immediate laparotomy; cord divided. *Termination*, recovery.

No. 9.—*Operator*, Hohlbeck: Arch. für klin. Chir., Band 61, 1900. *Age and Sex*, 4½, male. *Character of Symptoms*, repeated attacks of pain and constipation; last attack accompanied by complete obstruction lasting four days; on fifth day gas and fecal matter passed by bowels; tumor could be outlined at umbilicus. *Mode of Strangulation*, diverticulum attached to omentum; twisted on itself; intestine occluded at point of origin of diverticulum; necrosis of gut at point of strangulation. *Treatment*, resection of twenty-seven centimeters of small intestine. *Termination*, death.

No. 10.—*Operator*, Hohlbeck: Arch. für klin. Chir., Band 61. 1900. *Age and Sex*, 39 female. *Character of Symptoms*, complete obstruction lasting three days; abdominal distention, particularly on right side; fecal vomit. *Mode of Strangulation*,

diverticulum twenty-three centimeters long; free at distal end; knotted about a loop of ileum; intestine gangrenous. *Treatment*, resection of eighty centimeters; union by Murphy's button. *Termination*, recovery.

No. 11.—*Operator*, Hohlbeck: Arch. für klin. Chir., Band 61. 1900. *Age and Sex*, 18, ?. *Character of Symptoms*, sudden attack of severe abdominal pain, fecal vomiting, early; operation on second day. *Mode of Strangulation*, inversion of mucous membrane of Meckel's diverticulum; invagination of six inches of ileum. *Treatment*, invagination dislodged; diverticulum removed. *Termination*, death.

No. 12.—*Operator*, Robinson: British Medical Journal, 1899, vol. 2, p. 1416. *Age and Sex*, 5, male. *Character of Symptoms*, acute pain, referred to umbilicus; abdominal distention, with tumor in right side of abdomen; diagnosis, intussusception. *Mode of Strangulation*, inversion of diverticulum with invagination of ileum above diverticulum. *Treatment*, resection. *Termination*, death two hours after operation.

No. 13.—*Operator*, Symmonds: British Medical Journal, November 18, 1899. *Age and Sex*, ?, male. *Character of Symptoms*, pain; vomiting; abdominal distention with complete obstruction. *Mode of Strangulation*, "adherent diverticulum with gangrenous intestines." *Treatment*, laparotomy. *Termination*, death.

No. 14.—*Operator*, Symmonds: British Medical Journal, November 18, 1899. *Age and Sex*, 26, male. *Character of Symptoms*, complete obstruction lasting five days. *Mode of Strangulation*, "gut folded around a very wide diverticulum." *Treatment*, laparotomy. *Termination*, death.

No. 15.—*Operator*, Schmidt: Deutsche Zeitschrift für klin. Chir., 1899. *Age and Sex*, 15, female. *Character of Symptoms*, chronic obstruction of four weeks' duration. *Mode of Strangulation*, diverticulum attached to umbilicus, producing obstruction by kinking from traction. *Treatment*, laparotomy. *Termination*, death.

No. 16.—*Operator*, Berard et Delore: Lyon Méd., 1899, vol. 1, p. 90. *Age and Sex*, 20, male. *Character of Symptoms*, acute obstruction, with fecal vomiting and severe pain at umbilicus; diagnosis of internal hernia. *Mode of Strangulation*, diverticulum attached to umbilicus; obstruction of ileum and adhesion of loops. *Treatment*, laparotomy; diverticulum removed. *Termination*, recovery.

No. 17.—*Operator*, Malgagne et Blanc: Bull. de Soc. Anat. de Paris, 1899, p. 427. *Age and Sex*, ?, male. *Character of*

Symptoms, at first, symptoms of subacute appendicitis; incomplete obstruction and low fever. *Mode of Strangulation*, symptoms of acute obstruction from rupture of diverticulum and pressure of abscess on loop of gut. *Treatment*, laparotomy; removal of diverticulum and drainage of cavity. *Termination* (?).

No. 18.—*Operator*, Bell: Montreal Medical Journal, 1898. *Age and Sex*, 16, female. *Character of Symptoms*, acute abdominal pain and abdominal distention. *Mode of Strangulation*, diverticulum given off three feet above the ileocecal valve with ligament attached to right of umbilicus; obstruction by kinking just above the ileocecal valve. *Treatment*, laparotomy. *Termination*, recovery.

No. 19.—*Operator*, Nedivill: The Lancet (London), 1898, vol. 1, p. 1465. *Age and Sex*, 16, female. *Character of Symptoms*, abdominal pain; vomiting and constipation. *Mode of Strangulation*, cord-like band stretched across from umbilicus to right side of abdomen; loop of gut compressed under band. *Treatment*, laparotomy; division of band. *Termination*, recovery.

No. 20.—*Operator*, Küttner, Beiträge zur klin. Chir., Band 21, 1898. *Age and Sex*, 49, female. *Character of Symptoms*, classical symptoms of acute obstruction. *Mode of Strangulation*, cause not determined at operation; autopsy showed intussusception of diverticulum. *Treatment*, laparotomy; drainage of abdominal cavity. *Termination*, death.

No. 21.—*Operator*, Stubenrauch: Centralblatt für Chir., 1898, No. 26. *Age and Sex*, 5½, female. *Character of Symptoms*, sudden abdominal point; rectal tenesmus; bloody stool; vomiting and collapse. *Mode of Strangulation*, intussusception of ileum, starting at point of origin of diverticulum. *Treatment*, abdominal section. *Termination*, death.

No. 22.—*Operator*, Carle et Chavet: Prov. Méd., 1898. *Character of Symptoms*, sudden onset; obstruction, acute pain, vomiting, etc. *Mode of Strangulation*, diverticulum twelve centimeters long attached to mesentery completely encircling a loop of small intestine.

No. 23.—*Operator*, Guinard: Bull. et Mém. Soc. de Chir. de Paris, 1898. *Sex*, young boy. *Character of Symptoms*, acute obstruction, with severe abdominal pain lasting two days. *Mode of Strangulation*, diverticulum attached to mesorectum; loop of small intestine constricted by pressure from this band. *Treatment*, laparotomy; removal of diverticulum. *Termination*, recovery.

No. 24.—*Operator*, De Quervain: Centralblatt für Chir., 1898. *Age and Sex*, 16, male. *Character of Symptoms*, acute pain, fecal vomiting, complete obstruction. *Mode of Strangulation*, invagination of diverticulum. *Treatment*, resection. *Termination*, death.

No. 25.—*Operator*, Kramer: Centralblatt für Chir., 1898. *Age and Sex*, 18, male. *Character of Symptoms*, sudden pain, vomiting, and complete obstruction; painful tumor found in ileocecal region; visible peristalsis. *Mode of Strangulation*, pear-shaped diverticulum adherent to root of mesentery; small intestine strangulated by twisting at point of attachment. *Treatment*, laparotomy; removal of diverticulum. *Termination*, recovery.

No. 26.—*Operator*, Kramer: Centralblatt für Chir., 1898. *Age and Sex*, 40, male. *Character of Symptoms*, pain and tenderness of abdomen, with some dullness in right side, following kick of a horse; partial obstruction. *Mode of Strangulation*, first operation; pus cavity opened; urgent symptoms relieved; fecal fistula persisted. Second operation four months later; fistula found to lead to diverticulum, which was removed. *Treatment*, laparotomy. *Termination*, recovery.

No. 27.—*Operator*, Gildersleeve: Medical News (New York), 1898, vol. 62. *Age and Sex*, 21, male. *Character of Symptoms*, acute sudden pain and vomiting; diagnosis of appendicitis; collapse. *Mode of Strangulation*, diverticulum with its terminal ligament formed complete ring, through which a loop of gut passed. *Treatment*, no operation. *Termination*, death.

No. 28.—*Operator*, Thompson: Annals of Surgery, 1898, vol. 27. *Age and Sex*, 29, male. *Character of Symptoms*, sudden onset, some griping pains referred to umbilical region. *Mode of Strangulation*, diverticulum with terminal ligament attached to base of mesentery; strangulation of loop near ileocecal valve under this band. *Treatment*, operation five days after onset. *Termination*, death.

No. 29.—*Operator*, Fox: Transactions of the Pathological Society, London, 1897-8. *Age and Sex*, 5, male. *Character of Symptoms*, acute abdominal pain; nausea and vomiting; temperature of a pyemic type. *Mode of Strangulation* (autopsy), child with cleft palate; "diverticulum wound around gut at point of attachment"; diverticulum ruptured; obstruction of the root of diverticulum. *Treatment*, no operation. *Termination*, death.

No. 30.—*Operator*, Gally et Jeannel: Arch. Prov. de Chir., 1898. *Age and Sex*, 47, male. *Character of Symptoms*, acute abdominal pains, vomiting, and obstruction. *Mode of Strangulation*, twisting of gut with acute flexion at point of origin of diverticulum. *Treatment*, laparotomy; resection of gangrenous intestine. *Termination*, death.

No. 31.—*Operator*, Ewald: Berliner klin. Woch., 1897, No. 8. *Age and Sex*, 42, female. *Character of Symptoms*, recurrent attacks of partial obstruction; sudden onset; in last attack, with complete obstruction. *Mode of Strangulation* (autopsy), inflammatory stenosis above attachment of diverticulum; invagination of diverticulum; perforations of intestine. *Treatment*, no operation. *Termination*, death.

No. 32.—*Operator*, Heresco: Bull. de la Soc. Anat. de Paris, 1897, 61. *Age and Sex*, ?, ?. *Character of Symptoms*, sudden violent pain; fecal vomit; profuse perspiration. *Mode of Strangulation* (autopsy), diverticulum twenty-five centimeters long with ligament attached to mesentery; loop of ileum constricted under this band. *Treatment*, laparotomy; cause of obstruction not found at operation. *Termination*, death.

No. 33.—*Operator*, Kammerer: Annals of Surgery, vol 27. *Age and Sex*, 20, male. *Character of Symptoms*, acute pain in right side of abdomen; vomiting; greater distention on right side than on left. *Mode of Strangulation*, diverticulum six inches above ileocecal valve attached to mesentery; encircled a loop of ileum immediately above the diverticulum. *Treatment*, anastomosis with Murphy's button; no resection. *Termination*, death.

No. 34.—*Operator*, Kammerer: Annals of Surgery, vol. 26. *Age and Sex*, 44, male. *Character of Symptoms*, diarrhea and abdominal pain for one year; terminating in attack of severe abdominal pain, referred to umbilical region. *Mode of Strangulation*, diverticulum attached to umbilicus; part of sigmoid flexure compressed between diverticulum and anterior abdominal wall. *Treatment*, three operations. *Termination*, recovery; with artificial anus.

No. 35.—*Operator*, Kammerer: Annals of Surgery, vol. 26. *Age and Sex*, 18, female. *Character of Symptoms*, cramps, with constipation lasting three weeks; finally complete obstruction with fecal vomit, some pain, and marked peristalsis; no flatus. *Mode of Strangulation*, diverticulum with terminal ligament attached, but torn loose during operation; point of attachment not determined; gut strangulated under band; exact mechanism obstruction not determined.

Treatment, operation; diverticulum not removed. *Termination*, recovery.

No. 36.—*Operator*, Jordan: Berliner klin. Woch., 1896. *Age and Sex*, 19, male. *Character of Symptoms*, acute obstruction with pain lasting four days. *Mode of Strangulation*, diverticulum attached to umbilicus; obstruction by acute flexion at point of origin of diverticulum; intestine gangrenous. *Treatment*, laparotomy; lateral anastomosis. *Termination*, death.

No. 37.—*Operator*, Dugan: Pediatrics, 1896, vol. 2, p. 71. *Age and Sex*, 11, male. *Character of Symptoms*, sudden onset, complete obstruction; diagnosis of appendicitis. *Mode of Strangulation*, twisting of base of diverticulum; constriction by twisting of gut at point of origin of diverticulum. *Treatment*, diverticulum excised; gut sutured. *Termination*, recovery.

No. 38.—*Operator*, Latz: Medical Review, 1895. *Age and Sex*, 12, female. *Character of Symptoms*, acute abdominal pain; fecal vomiting; no flatus. *Mode of Strangulation*, diverticulum with terminal ligament attached to mesentery; underneath was a loop of gut that was strangulated. *Treatment*, operation. *Termination*, death.

No. 39.—*Operator*, Latz: Medical Review, 1895. *Age and Sex*, 4, male. *Character of Symptoms*, sudden colicky pain; early fecal vomit; rapid pulse and high temperature. *Mode of Strangulation*, diverticulum with terminal ligament attached to mesentery (secondary); loop of gut constricted under band. *Treatment*, operation; gut sutured. *Termination*, recovery.

No. 40.—*Operator*, Broca: Bull. Soc. de Anat. de Paris, 1895. *Age and Sex*, seven weeks, male. *Character of Symptoms*, sudden onset of typical acute obstruction of intestine. *Mode of Strangulation*, diverticulum adherent to mesentery, forming band; small intestine strangulated under this band. *Treatment*, operation; gut released. *Termination*, death.

No. 41.—*Operator*, Elliott: Boston Medical and Surgical Journal, 1894. *Age and Sex*, 30, male. *Character of Symptoms*, sudden onset of vomiting, chills, and severe pain; pulse, 160; diagnosis of acute appendicitis. *Mode of Strangulation*, diverticulum seven inches long, of size of ileum, attached to umbilicus; diverticulum twisted at point of attachment to intestine. *Treatment*, laparotomy; diverticulum removed; intestine sutured. *Termination*, death.

No. 42.—*Operator*, Councilman: Boston Medical and Surgi-

cal Journal, 1894. *Character of Symptoms*, sudden onset; death in sixteen hours from acute obstruction. *Mode of Strangulation* (autopsy), diverticulum attached to mesentery, formed a ring which completely surrounded a loop of gangrenous intestine. *Treatment*, none mentioned. *Termination*, death.

No. 43.—*Operator*, Boyle: Arch. de Méd. et de Pharm. Militeres, 1894. *Character of Symptoms*, symptoms of obstruction developed gradually; not complete until ninth day. *Mode of Strangulation*, diverticulum attached to umbilicus; loop of small intestine constricted under tensely drawn band. *Treatment*, operation; constriction removed. *Termination*, death.

No. 44.—*Operator*, Cazin: Soc. de Anat. de Paris, 1893. *Age and Sex*, 11, male. *Character of Symptoms*, acute onset. *Mode of Strangulation*, unattached diverticulum snared a loop of small intestine. *Treatment*, resection of diverticulum. *Termination*, death.

No. 45.—*Operator*, Makins: British Medical Journal, 1893, vol. 1, p. 147. *Character of Symptoms*, acute obstruction of the intestine. *Mode of Strangulation*, diverticulum twisted, gangrenous, perforated. *Treatment*, operation. *Termination*, death.

No. 46.—*Operator*, Ochsner, A. J.: Journal of the American Medical Association, July 29, 1893. *Age and Sex*, 81, male. *Character of Symptoms*, sudden onset of symptoms of acute obstruction. *Mode of Strangulation*, diverticulum with ligament attached to mesentery, formed loop through which small intestine had become strangulated. *Treatment*, loop disengaged; no resection. *Termination*, death.

No. 47.—*Operator*, Prince: Medical News (Philadelphia), 1893. *Age and Sex*, 4, female. *Character of Symptoms*, acute onset complete obstruction lasting six days. *Mode of Strangulation*, diverticulum with ligament one inch in length, attached to mesentery, forming ring; loop of small intestine strangulated in ring. *Treatment*, resection; end-to-end union with Murphy's button. *Termination*, death.

No. 48.—*Operator*, Oderfeld: Gaz. Sekarska, January, 1892. *Character of Symptoms*, acute obstruction; diagnosis of obstruction by Meckel's diverticulum. *Mode of Strangulation*, diverticulum attached to mesentery, forming loop; knuckle of small intestine caught in loop and strangulated. *Treatment*, laparotomy; diverticulum removed. *Termination*, recovery.

No. 49.—*Operator*, Zurnrinkle: Arch. für klin. Chir., Band

40, 1892. *Age and Sex*, 19, male. *Character of Symptoms*, acute onset of obstruction lasting two and a half days. *Mode of Strangulation*, diverticulum with ligament ninety-five centimeters above ileocecal valve; ligament attached to mesentery forming ring; loop of gut caught under ligament. *Treatment*, laparotomy; removal of diverticulum. *Termination*, death ten hours after operation.

No. 50—*Operator*, Allen: Medical News, 1892, vol. 61. *Age and Sex*, 34, male. *Character of Symptoms*, sudden onset, complete obstruction. *Mode of Strangulation*, diverticulum four inches long, from region of cecum to the abdominal wall near umbilicus; intestine twisted about this band. *Treatment*, laparotomy. *Termination* (?).

No. 51.—*Operator*, Adams: St. Bartholomew's Hospital Reports, 1891. *Age and Sex*, 42, male. *Character of Symptoms*, obscure, rather chronic; evidence of obstruction lasting two weeks. *Mode of Strangulation* (autopsy), invagination of diverticulum and ileocolic intussusception. *Treatment*, no operation. *Termination*, death.

No. 52.—*Operator*, Adams: St. Bartholomew's Hospital Reports, 1891. *Age and Sex*, ?, male. *Character of Symptoms*, no clinical history. *Mode of Strangulation* (autopsy), intussusception of diverticulum. *Termination*, death.

No. 53.—*Operator*, Mackenzie: Transactions of the Pathological Society, London, 1889-90, p. 127. *Age and Sex*, 37, male. *Character of Symptoms*, acute obstruction; vomiting; abdominal distention and pain. *Mode of Strangulation*, diverticulum attached to umbilicus; volvulus of five feet of ileum above origin of diverticulum. *Treatment*, no operation. *Termination*, death.

No. 54.—*Operator*, Chassevant: Bull. de la Soc. de Anat. de Paris, 1890. *Character of Symptoms*, classical symptoms of acute intestinal obstruction. *Mode of Strangulation* (autopsy), diverticulum fifty centimeters above ileocecal valve, attached to umbilicus; obstruction by torsion of diverticulum. *Treatment*, no operation. *Termination*, death.

No. 55.—*Operator*, Prendelsberge: Wiener klin. Woch., 1901. *Age and Sex*, 51, male. *Character of Symptoms*, acute onset; vomiting; abdominal distention and severe pain. *Mode of Strangulation* (autopsy), unusually long diverticulum, which had become attached to mesentery; acted as band. *Treatment*, laparotomy; cause of obstruction not found at operation. *Termination*, death.

No. 56.—*Operator*, Taylor: British Medical Journal, 1901.

Age and Sex, 22, male. *Character of Symptoms*, symptoms of acute ileus. *Mode of Strangulation*, diverticulum given off one inch above ileocecal valve; terminal ligament adherent to small intestine about one and a half feet above origin of diverticulum; intestine constricted under band. *Treatment*, laparotomy; strangulated loop withdrawn. *Termination*, death.

No. 57.—*Operator*, Campbell: British Medical Journal, 1901, vol. 1, p. 1263. *Age and Sex*, 71, male. *Character of Symptoms*, acute obstruction; death on third day. *Mode of Strangulation* (autopsy), "diverticulum had established a pathological relationship, but had no normal attachment of distal end"; acted as band. *Treatment*, no operation. *Termination*, death.

No. 58.—*Operator*, Walzberge: Verhand. deutsche Gesellschaft für Chir., 1898. *Age and Sex*, 25, male. *Character of Symptoms*, those of acute ileus, lasting three days. *Mode of Strangulation*, diverticulum free; both ends obliterated; obstruction from kinking of intestine at point of origin of diverticulum; diverticulum formed cyst; intestine necrotic. *Treatment*, diverticulum removed; necrotic patch in gut inverted. *Termination*, death.

No. 59.—*Operator*, Walzberge: Verhand. deutsche Gesellschaft für Chir., 1898. *Age and Sex*, 14, male. *Character of Symptoms*, acute obstruction, lasting three days. *Mode of Strangulation* (autopsy), distended diverticulum attached to umbilicus; torsion of diverticulum with sharp twist in gut, at point of origin of diverticulum; intestine necrotic. *Treatment*, operation; artificial anus established; diverticulum not removed. *Termination*, death.

No. 60.—*Operator*, Mintz: Deutsche Zeitschr. für Chir., Band 43. *Age and Sex*, 24, male. *Character of Symptoms*, acute ileus; great distention of upper zone of abdomen; tenderness near umbilicus; death on fifth day. *Mode of Strangulation*, diverticulum attached to mesentery, forming a ring; within this a loop of ileum was strangulated. *Treatment*, no operation. *Termination*, death.

No. 61.—*Operator*, Weill et Frankel: Bull. de la Soc. de Anat. de Paris, 1896. *Age and Sex*, 4, female. *Character of Symptoms*, acute ileus, one day's duration. *Mode of Strangulation*, invagination of diverticulum and ileum. *Treatment*, resection of intestine: suture. *Termination*, death.

No. 62.—*Operator*, Williams, D. H., Chicago: Personal communication. *Age and Sex*, 25, male. *Character of Symptoms*, acute ileus. *Mode of Strangulation*, diverticulum with liga-

ment adherent to mesentery; strangulation under band. *Treatment*, laparotomy. *Termination*, death.

No. 63.—*Operator*, Morgan, W. E., Chicago: Personal communication. *Age and Sex*, 38, male. *Character of Symptoms*, acute ileus, complete obstruction. *Mode of Strangulation*, diverticulum with ligament attached to mesentery. *Treatment*, amputation of diverticulum. *Termination*, recovery.

No. 64.—*Operator*, McArthur, L. L., Chicago: Personal communication. *Age and Sex*, 40, male. *Character of Symptoms*, acute obstruction. *Mode of Strangulation*, diverticular cord, with ligament attached to mesentery and umbilicus constricted appendix under tightly drawn band; gangrenous appendicitis and rupture with peritonitis. *Treatment*, operation; removed appendix and diverticulum. *Termination*, death.

No. 65.—*Operator*, Henrotin, F., Chicago: Personal communication. *Character of Symptoms*, acute ileus eight days after operation for appendicitis, excessive tympany, pain, vomiting, etc. *Mode of Strangulation*, diverticulum five and a half inches long, attached by inflammatory adhesions to exudate about stump of appendix; small intestine twisted and obstructed. *Treatment*, operation; strangulation relieved. *Termination*, recovery.

No. 66.—*Operator*, Davison, Chas., Chicago: Personal communication. *Age and Sex*, 7, male. *Character of Symptoms*, acute obstruction; subnormal temperature; tympany; collapse on fourth day. *Mode of Strangulation*, diverticulum two and a half feet from cecum; terminal ligature apparently attached to another loop of small intestine. *Treatment*, operation; strangulation relieved. *Termination*, death.

No. 67.—*Operator*, Bevan, A. D., Chicago: Personal communication. *Age and Sex*, 35, male. *Character of Symptoms*, sudden onset: complete obstruction. *Mode of Strangulation*, diverticulum with ligament attached to umbilicus; acted as band. *Treatment*, removed diverticulum. *Termination*, recovery.

No. 68.—*Operator*, Bevan, A. D., Chicago: Personal communication. *Age and Sex*, 22, female. *Character of Symptoms*, acute ileus. *Mode of Strangulation*, diverticulum with ligament formed loop. *Treatment*, operation; diverticulum removed. *Termination*, recovery.

No. 69.—*Operator*, Halstead, A. E., August, 1901. (Not reported.) *Age and Sex*, 26, male. *Character of Symptoms*, several previous attacks; sudden onset; vomiting, pain, and

abdominal distention; no flatus. *Mode of Strangulation*, diverticulum one and a half inches, with ligament two and a half inches, attached to mesentery forming ring; ileum constricted by this ring. *Treatment*, laparotomy; removal of diverticulum. *Termination*, recovery.

SUMMARY.

Number of cases reviewed	69
Males, 44; females, 16. (Sex recorded)	60
Result noted in	66
Deaths	45
Recoveries	21
Percentage of mortality	68.1
Cases operated upon	57
Result in cases operated upon mentioned in	54
Death in cases operated upon	32
No operation in	12
Percentages of death in cases operated	59.1
Attachment or non-attachment of diverticulum or diverticulum ligament recorded in	63
Not mentioned	6
Attached	48
Free	15
To mesentery in	23
To umbilicus in	15
Not determined in	3
To mesocolon in	1
To mesorectum	1
To small intestine	3
To omentum	1
To peri-appendicular exudate	1

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DISCUSSION.

DR. A. C. BERNAYS, of St. Louis, Mo.: Mr. President—The paper which we have heard is a very complete one, and I have nothing in particular to add to what the doctor has already told you. But I have a specimen which I want to show. It is too large to pass around. It is a beautiful specimen of Meckel's diverticulum, but that was only an accidental finding. The patient was a young Englishman upon whom I operated nineteen days ago, removing a hundred and nineteen inches of the small intestine. The cause for performing the operation was rapid emaciation, the patient decreasing in weight from 170 pounds to 117 during the last six months, without pains of any kind, and without any appreciable cause. It was not until he became very much emaciated that he was able to feel the tumor I present to you. The tumor was the size of a saucer, and occupied the middle portion of the patient's abdomen. It was movable from side to side, and upwards and downwards. The diagnosis was either a mesenteric or omental tumor, and I determined to do an exploratory laparotomy. As a result of that, I made a resection of a hundred and nineteen inches of the small intestine. I believe, according to what I have heard this morning, it is the longest piece of small intestine ever resected successfully in a human being. I have here a saucer-like tumor, about an inch and a half thick, covered by peritoneum on both surfaces. In doing the operation I put a ligature around the inferior mesenteric artery, and then tied off close to the abdominal aorta. There is a continuous piece of gut measuring a hundred and nineteen inches. I measured it at the time it was fresh, and it may measure more now. I put on two clamps, one at each end of the tumor, at each loop of the gut, and in a few minutes excised the whole thing, and tied the vessel. After having done that, I found one end of the gut looked blue, and not

well nourished with good arterial blood, and I resected this piece of gut in addition. I show you the Meckel's diverticulum, which is the most beautiful one I ever saw.

From my studies in embryology, it was claimed by Heckel and Giegenbauer that there was only one way to tell where the ileum began and the jejunum ended, and that was in those cases where there is a Meckel's diverticulum. Meckel's diverticulum occurs in two per cent. of all persons, and in this case I can positively state that I resected all but three inches of this man's ileum and several feet of the jejunum. The man was sitting up on the day I left for this meeting. The wound has united by first intention. He was eating six times a day. There was one unfavorable symptom, and that was he was having three stools per day instead of only one. On the ninth day we weighed him, and found that he had not lost quite a pound since the operation, and since then he has been gaining nearly a pound a day.

The case is interesting because Senn, among other authorities, has stated that if more than one-third of the small intestine was removed, the operation would be followed by death from inanition. I hope this case will show that that statement is not true. I trust we can find ways and means of nourishing this patient, so as to keep him alive. He is only thirty years of age.

DR. OVIATT: What is the nature of the tumor?

DR. BERNAYS: I think it is a sarcoma. Dr. Halstead will have an expert examine the specimen histologically and pathologically.

DR. DONALD MACRAE, JR.: I want to have one statement that was made by Dr. Bernays cleared up, and it is an anatomical point. I believe he stated that there was only one way we knew where the jejunum ended and the ileum began, and that was Meckel's diverticulum. I thought the ileum was longer than that. Meckel's diverticulum is usually about three feet from the ileocecal valve.

DR. BERNAYS: I am convinced that Meckel's diverticulum is not always in the same place. But we have no right to call anything Meckel's diverticulum except that which has the remains of the omphalomesenteric duct, and the latter has been assumed. It is arbitrary to call it a boundary line between the ileum and jejunum. But we have no boundary line outside Peyer's follicles, and these are only found in the ileum, and not in the jejunum. We know that is also not exactly true. No man can draw a distinct line between a solitary follicle and conglomerated follicle. We usually have only solitary follicles in the colon and jejunum, and we have them conglomerated in Peyer's patches in the ileum. Every experienced pathologist in typhoid fever cases has seen sometimes ulcers extend away up higher than the ileum, and sometimes they are away below the ileocecal valve, and we have typhoid ulcers in the colon.

DR. HALSTEAD (closing the discussion): According to recent researches, Meckel's diverticulum may be as high up as the esophagus. In a very recent paper on the origin of esophageal diverticulum, the diverticulum took its origin

from the remains of the omphalomesenteric duct. True, Meckel's diverticula have been recognized as low as three-quarters of an inch from the ileocecal valve, and as high in the intestine as the jejunum. At a certain period of fetal life, it represents approximately the division between the jejunum and ileum, but after the omphalomesenteric duct has disappeared, say the fifth week, the upper part of the intestine amounts to a great deal more than the lower. The small intestine develops in length after that period.

There are a few points I would like to mention in closing the discussion, and among them the characteristic symptoms of obstruction from Meckel's diverticulum. It seems impossible to produce obstruction from Meckel's diverticulum, but there are certain things we must consider, the configuration of the abdomen, and the obstruction from Meckel's diverticulum is above the umbilicus. Second, absence of distention in tne flank. Third, about the right hypochondriac region we find a point of tenderness. When the Meckel's diverticulum is attached to the umbilicus, the area is tender. We have visible peristaltic movements of the intestines in the early stage of this form of obstruction.

GRAVE ABDOMINAL INJURIES WITHOUT EXTERNAL EVIDENCES OF TRAUMATISM.

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It has been my privilege during the last twenty years to have met with a class of grave abdominal injuries which has given little or no external evidence of traumatism. The patient in each instance has given a history of a severe injury which in five out of six cases that I have seen has resulted in death, in from 24 hours to 26 days after the traumatism. I will only report three of these cases in detail, as the others were practically duplicates and to make a full report would only take up valuable time without special advantage.

The first of these cases which came to my notice occurred about fifteen years ago, in an unusually

large, healthy man of some 36 years of age, who had charge of a planing mill in Crestline, Ohio. At the time the accident occurred, he was engaged in sawing palings with a buzz-saw. These palings were about three feet in length, some two inches wide and one inch thick. In some manner one of them caught in the buzz-saw, and was thrown forcibly endwise, a distance of some six feet, striking him very forcibly over the left hypochondriac region. Whilst the injury caused some pain, he continued his work for a short time, when he became sick and was taken to his home. Two of the local physicians were called in to see him, and being unable to find any external signs of injury, further than the mark made by the end of the paling, which had simply reddened the skin for a distance of two inches in one direction and one inch in the other, they were of the opinion that he was simply suffering from shock and that he would soon recover. On the contrary, he continued to grow worse; the abdomen became tympanitic and grave symptoms made their appearance. I was called in council, and, after examining the case carefully, gave it as my opinion that there was a rupture of the intestine and advised operation. There being no hospital at our command and not even trained nurses, he was operated on at his home with the assistance of the local physicians. On opening the abdominal cavity, I found the abdominal parietes perfectly intact. Not the slightest ecchymosis or the slightest tear of the muscles of the abdominal walls could be found. On entering the abdomen, I found a large tear of the ileum, located immediately under the point of contact made by the paling. This tear was of a triangular nature, and was sufficiently large to enable me to pass my finger into

the intestine through this opening without difficulty. The abdominal cavity was filled with fecal matter. Acute general peritonitis had set in, and although the abdominal cavity was washed out carefully and the injured intestine sutured with silk, the patient died in three days after the operation, about six days after the injury. It seemed to me at the time remarkable that a traumatism of this character should produce such a grave injury of the intestine without injury to the abdominal walls, further than a little reddening of the skin.

A few years later, I saw in council two cases similar to the one above described. One was kicked by a horse and the other, while running at night, ran against the end of a rail. In each instance there was no injury to the abdominal walls, but a tear of the stomach in one case and of the large intestine in the other, produced death a few hours after the accident. I regret that I have not all of the details of these two cases at my command, yet at the same time they are so nearly like the one already described that it would add but little to our fund of knowledge if we were able to give the full details of them.

On September 21, 1901, a Bohemian miner, aged 45, was caught by falling rock, producing a contusion of the back and hips, extending to both thighs, without fracture of the pelvis. He was brought immediately after the injury to the Wyoming General Hospital, which was less than two miles from where the accident occurred, and was admitted to the same ward as Case No. 1816. He suffered severely from shock, which was complicated by vomiting and epistaxis, but beyond this, no hemorrhage occurred. The ordinary line of treatment was followed, such as morphine and strych-

nine for the shock, with warm local applications over the contused parts. He never rallied from the shock and died in about twenty-four hours after the accident. A post-mortem, held twelve hours after death, revealed two perforations of the small intestine, located about six inches above the ileo-cecal valve, which were followed by peritonitis, the result of infection from the fecal extravasation. A careful examination failed to find any material injury to the abdominal walls, not even a tear of the parietal peritoneum, and no solution of continuity of any of the muscular layers of the abdominal walls. In fact, the injury had not produced any marked ecchymosis, and the physical signs usually present in severe injuries were conspicuously absent.

Another case in point was admitted to the Wyoming General Hospital, November 20, 1901, as Case No. 1895. This man was an American, aged 30; occupation, a driver in the Union Pacific Coal Company mine at Spring Valley, Wyo., and was injured November 15, 1901. While driving the cars, he was caught in some way between the "ribs" of the mine and car, sustaining a contusion on the left side and back, with a fracture of the pelvis on the left side, along the ileo-ischial juncture. There was no evidence of displacement of the fragments, but in certain positions, crepitus could be readily elicited. The symptoms were so negative at first, that the very competent assistant surgeon, Dr. Levers, was led to believe that the injuries were of a trivial character. During the first four days following the injury, the patient's pulse, temperature and respiration were normal. Following the administration of small doses of magnesium sulphate, he had thorough evacuation of the bowels.

Notwithstanding the fracture of the pelvis, this man was able to be up and stood on his feet and walked some on the third day following the injury. On the morning of the fifth day, his condition suddenly grew worse, pulse increased to 120 and temperature decreased to 97°. The abdomen became distended, was dull on percussion over the left side and the patient became delirious, in which condition he reached the Wyoming General Hospital, on November 20, five days after the accident.

The general appearance of this case when he reached the hospital was such as to lead one to suspect the existence of a rupture of the intestine, with localized peritonitis, except for the fact that his bowels moved regularly, which could hardly be expected in case of a rupture, with either general or local peritonitis. His delirium continued for four or five days after his admission to the hospital, when it began to subside, and his temperature, which had ranged from 98 to 103.5°, subsided to normal, although the dulness over the left hypochondriac region continued. This, however, began to subside, until the resonance on the left side of the abdomen approached nearly to the normal, which led me to the conclusion that we had had a hematoma to contend with, which in my judgment was located between the layers of the muscles of the left side of the abdomen. About December 3, the patient became worse. The area of dullness suddenly became much larger and very marked. His temperature ranged from 97 to 103.5° F., and an operation seemed to be imperative. I operated on this case on December 6, making an incision in the left iliac region. I dissected carefully through the different layers of muscles, and to my surprise, found them intact, and no

hematoma. On passing through the last layer, I found a large cavity, filled with blood, broken-down blood clots, and serum. This cavity contained about a gallon of this liquid. After washing the cavity out thoroughly, I found that the peritoneum had been torn loose from the walls of the abdomen from a point midway down the pelvis to the diaphragm, and from the rectus muscle anteriorly to the vertebra posteriorly. The left kidney had been displaced and was apparently floating, and the entire descending colon, together with the balance of the abdominal viscera which should occupy the left side, were pushed over to nearly the median line, and were enveloped in a sack of loose peritoneum. There was not the slightest evidence of peritonitis, the bowels being flat, and apparently showing no signs of irritation.

There being considerable hemorrhage in the form of capillary oozing, I carried a second incision at right angles with the first, for the purpose of drainage, cutting through the abdominal muscles, to the outer border of the lumbar muscles. After thoroughly cleansing this cavity, I drenched the parts with hydrogen peroxid, after which it was packed with a large quantity of gauze soaked in warm bichlorid evaporating solution. The patient, although weak and exhausted before the operation, rallied from it very nicely.

The day following the operation he seemed to be semiconscious, apparently the result of exhaustion, as there was no evidence of inflammatory trouble, and little or no rise of temperature. There was no effort at repair, and whilst the wound remained perfectly clean, there was a peculiar ammoniacal odor connected with it, although there was no evidence of escape of urine into the wound from either the kidney,

ureter or bladder; this condition, to my mind, indicated molecular dissolution. There was incontinence of urine, and whilst the patient took considerable nourishment, which apparently seemed to digest, yet he gradually sank and died on December 11, just five days after the operation and twenty-seven days after the accident.

GENERAL COMMENTS.

We have had here a series of injuries in which there were grave abdominal injuries without corresponding external evidences of traumatism, yet the result in each case was fatal. In four of the cases reported, we have had rupture of some part of the alimentary canal, followed by death. What are the lessons we are to learn from these grave accidents? Could the lives of these patients have been saved through operative interference?

In the first case, in which the patient was struck by a paling, I firmly believe that if operative interference had been resorted to immediately after the accident, that the patient would have survived the injury. In the case of rupture of the stomach, there was such general infection of the entire abdominal cavity, as shown by the post-mortem, such rapid collapse, that I question whether it would have been possible to have saved the life of this patient unless the surgeon had been actually on the ground at the time, and made immediate operation. It must be remembered, as in this case, that these accidents frequently occur miles from surgical aid, and by the time the surgeon reaches the patient the time for active interference has passed.

This applies to the third case, in which the patient ran violently against the end of a rail, producing rupture of the intestine, but as the patient was past all

hope of recovery when seen by the writer, and no post-mortem was permitted, it is only conjecture as to the real injury produced. At all events, operative interference would have failed in this case by the time it was possible for a surgeon to reach him.

In the Bohemian miner, the question of immediate operative interference might well be considered. This man was in the hospital in less than three hours from the time the accident occurred. The question of operative intervention came up, but inasmuch as the patient never rallied from shock, I did not consider it good surgery to undertake an abdominal operation without any knowledge of where the injury might be located, with a pulseless patient, suffering from extreme shock, from which he never rallied. Had I seen the slightest sign of rallying, I would have operated on him at once.

This, of course, brings up the mooted question of operating in shock, and although I have for many years advocated major amputations under shock, and have made many such amputations under such circumstances where the patient has rallied after the removal of a mangled limb, whom I doubt ever would have rallied without its removal, I was skeptical in this case. In abdominal operations where there is severe shock, it seems to me that there is a different condition of affairs to contend with, and it is a question in my mind whether operative interference for grave abdominal injuries, with the patient suffering from the severest form of shock, is advisable, or would result in benefit to the patient except in case of hemorrhage.

The last case is a peculiar one, and brings up the question of operations for hematoma. It is my custom not to operate for hematoma as long as there is reasonable hope of their being absorbed. I see many

accidents every year in which there are marked hematoma located between the muscles, which are rapidly absorbed, and the patient gets well with little or no difficulty. Occasionally we have hematoma that do not absorb, which I consider proper cases for operative interference, and would treat such cases the same as I would a pocket of pus: evacuate and drain thoroughly. We admit, in these days of antiseptic and aseptic surgery, that incision into muscular tissue with evacuation of collections of blood, ought not to be followed by infection, but notwithstanding all the precautions the surgeon may resort to, these patients are liable to become infected. I seldom make compound of simple, or open of closed wounds when it can be avoided, and particularly so where nature is inclined to take care of the extravasation by the natural channels of absorption. This is particularly true when we have different nationalities to deal with who do not readily understand or thoroughly comprehend the English language and are liable to unintentionally disregard the surgeon's instructions.

CONCLUSION.

From reading the literature of this class of cases, together with my own experience, I am led to the conclusion that it is the surgeon's duty to make an exploratory incision in all cases where there is grave doubt as to the real nature of the injury, and particularly so when the constitutional symptoms point to a condition more serious than is indicated by either the subjective or objective symptoms, provided the physical condition of the patient is such as to warrant an operative procedure.

THE IMMEDIATE EFFECTS OF INTESTINAL EXPOSURE.

By A. W. ABBOTT, M. D.,
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It has been recognized as self-evident that the exposure of the intestines is accompanied by the loss of a certain amount of water and heat, the two physical accompaniments of evaporation. It has been assumed that this loss of water accounted largely for the invariable great thirst after abdominal operations, for some of the shock, and that the resulting drying of the peritoneal surface, together with the loss of heat, lowered the vitality of the serosa, making it a better germ culture field. In order to ascertain the amount of loss in water and heat under such conditions the writer made the following experiments: Two dogs were placed on boards, thoroughly anesthetized and then weighed. The abdomen was then opened and the intestines drawn out and freely exposed for thirty minutes. The abdomen was then closed and the dog and board again weighed. The loss in weight was too little to be indicated by scales which plainly indicated a variation of one-half ounce avoirdupois. There was no loss by urine or feces, but about two drachms in saliva. The loss by evaporation was, therefore, certainly not more than two drachms avoirdupois and probably less. This loss is so small that we may entirely eliminate the mere loss of water as being of any importance. That is to say, the amount of water evaporated from the intestinal surface during the most formidable operation is so slight that it can have no appreciable effect in producing thirst. A pint of the normal salt solution introduced into the bowel

just before an abdominal operation contains probably at least 75 times as much water as is evaporated from the peritoneum. In fact a large surplus will find its way to the bladder during a thirty minutes' operation, and yet it does not very materially affect the thirst. The same is true of the filling the abdominal cavity with the salt solution at the close of an operation. Holding water in the mouth or the swallowing of water in sips, especially if hot, has a much greater influence in modifying the thirst. The first action of the bowels after a celiotomy is coincident with the disappearance of the thirst. Hence we may positively conclude (1) that the thirst is not occasioned by the loss of water; (2) that the thirst is probably due to a direct effect of the anesthetic upon the nerves of the salivary glands and mucosa of the alimentary canal, and therefore analogous to the morning thirst of the drunkard; (3) that the introduction of large quantities of water in any manner for the prevention of post-operative thirst alone is ineffective and unnecessary. Here we must make a clear distinction between the mere abstraction of water and its physical effects, namely, the cooling and drying. While the amount of water lost is insignificant, the evaporation is rapid and the loss of heat is considerable. The loss of heat is not wholly due to the rapid evaporation, but partly to direct radiation. To ascertain more definitely the amount of heat lost, the following experiments were made. The rectal temperature of four dogs was taken. All were then anesthetized with ether. A median incision was made in three of the dogs and the intestines freely exposed. Thermometers were placed, not on the surface of the intestines, but between two folds, so that the bulb was always well covered. In two of these dogs a small

puncture was made and the bulb of a thermometer forced into the lumen of the gut. The abdomen of one of the four dogs anesthetized was not opened. The rectal temperature was recorded in all, so that the surface temperature of the exposed intestines was taken in three dogs, the internal intestinal temperature in two of the same dogs, and the rectal temperature in all four dogs. The temperature of the room was 72° F.

Time in Minutes.	Rectal Temp ° F.				Surface Temp. of Intestines ° F.				Internal Temp. of Intestines ° F.			
	Operated.			Control.	Operated.			Control.	Operated.			Control.
	1	2	3	4	1	2	3	4	1	2	3	4
Before ether	98.5	103	98	98	....	...	....	..	..	...	....	..
During ether												
5	....	...	...	...	....	...	94	Not taken	Not taken	...	....	Not taken
10	....	...	95	...	94.6	99	90			...	....	
15	....	...	...	...	....	93	88			...	90	
20	....	...	94	98	....	92	....			...	87.5	
25	....	...	...	...	....	92	....			...	87	
30	96	96	94	98	93	88	87.5	..	..	92	87	..

Remarks.—The cause of the high temperature (103° F.) in No. 2 is unknown. The surface temperature of No. 1 (93° F.) was estimated, as thermometer was marked only to 95° F. It is probably too high.

It will be observed that in the control dog No. 4 the rectal temperature remained at 98° during the thirty minutes of anesthesia. This is not the rule, as there is usually a drop of 0.5° at least. In the three dogs whose intestines were exposed, there was a drop of from 2.5° to 7° F. in the rectal temperature, from 5° to 15° F. in the surface temperature, and 11° F. in the internal intestinal temperature.

In these experiments the drying of the surface of the intestines was also noted. In three minutes the gloss of the peritoneum was lost; in ten minutes a superficial whitening was very evident, with a beginning of minute

wrinkles; while in twenty minutes the serosa seemed distinctly dry, wrinkled and gray, showing a rapid local loss in fluid and a manifest disturbance of the endothelium. An attempt was made to study the desiccation of the peritoneum under the microscope, but the results were not satisfactory. Other observations were made at the same time by different observers as to red and white blood count, and hemoglobin estimate for the same period, but no essential changes were found, or expected except a slight increase in the leucocyte count, and that was as much in the control dog, that was etherized only, as in the dogs operated upon.

From the above we may conclude, in operations where the intestines are exposed:

(1.) That the loss of water is unimportant, except in so far as it influences the loss of heat and the drying of the surface.

(2.) That the loss of heat is very important, as it temporarily places the temperature of the intestines below the safety line of vital action, and secondarily the heat of the whole body below that which can be continuously maintained.

(3.) That the drying of the peritoneum is so decided that it must disturb to some extent the anatomical relations, and the resisting and recuperating power of that membrane.

(4.) That the loss of heat and the drying process must suspend for an undetermined period some of the physiological functions of the peritoneum, and influence, to a degree as yet unknown, pathological conditions.

These conclusions the modern surgeon has reached

clinically, in a general way, as shown by his short incision, protection pads, a minimum exposure of the peritoneum and short-time operations.

It seems to the writer that we have not appreciated the great liability to the great loss of heat and rapid loss of moisture, and that we can do still more to protect the peritoneum in these respects. For the last year the writer has used squares of thin rubber dam applied directly to the intestines and these have been covered with the usual gauze pads. In the future all parts of the peritoneum exposed to the atmosphere and not in the immediate field of the operation will be so covered and protected.

Another conclusion which may be reached by the above experiments is, that the good results obtained by the introduction of large amounts of hot water in the veins, under the skin or in the rectum, are due to the stimulating effects of the heat carried in the water rather than to the making up of any loss of fluid, and hence that the more rapid introduction possible by way of the rectum, and that organ's larger capacity and favorable position, should make it, at least theoretically, the best avenue for the most effective and rapid restitution of the lost heat. Another logical deduction would follow, namely that our object should be to introduce the requisite amount of heat as rapidly as possible rather than to depend upon any particular amount of water.

The usefulness of water to replace loss by hemorrhage, to dilute septic fluids, to stimulate the secretions, etc., while not denied, has not been discussed in this paper, as it would carry it beyond its purpose.

The exposure of the peritoneum as causing a drying

of its surface is probably more important than the amount of study hitherto given it would seem to indicate.

In order to observe the combined effects of loss of heat and moisture, from exposure, upon the circulation, a dog was opened under ether and the intestines exposed in a room temperature of 64° F. In thirty minutes the rectal temperature ran down as in the other similar experiments to 93° F. and the exposed surface temperature of peritoneum to 75° F. A microscope was then placed, so that the most transparent part of the mesentery could be drawn into the field. Using a ⅔ objective the blood currents in the capillaries could be very easily observed. The remarkable fact was noted that though the surface temperature of the part was so low (75° F.) and the surface wrinkled and dry, no diminution in the force or rapidity of the circulation could be made out. The observation was continued for nearly an hour, and still no change was apparent. A higher power could not be satisfactorily used on account of the motion imparted by the breathing of the dog.

It will be seen from the above that some of the conditions observed conform to our preconceived notions, while others, especially as to the amount of loss of water, the amount of the loss of heat, and the disturbance of the circulation, do not.

The writer believes that the exposure of the peritoneum should be the subject of a more critical study and that this should be supplemented by extended experiments on the later effects, especially in their relation to peritonitis and adhesions.

DISCUSSION.

DR. WILLIAM JEPSON, of Sioux City, Ia.: Mr. President—I have no doubt that the bladder or, in fact, any of the hollow viscera containing liquid, may become ruptured upon a certain application of violence, the violence hardly giving any evidence externally of its application. The practical deduction from this is, that every patient subjected to severe violence sufficient to cause sudden phenomena or disturbances, as, for example, those of shock or hemorrhage, should be carefully watched to ascertain as to whether one of three things has occurred. First, rupture with liberation of the contents; second, possibly devitalization of the walls, so that they give way, with infection of the intestine or peritoneum by pathogenic germs; third, adhesions following with obstruction.

I am more particularly interested in the last case described by the doctor, because it calls to my mind so vividly the fact that we sometimes overlook grave lesions. The doctor did not tell us what the cause of the injury was, but stated that there existed a fracture of the pelvis. Every individual who has a fracture of the pelvis, we recognize as possibly having a rupture of the bladder, either intra- or extra-peritoneal. The first is a formidable condition, and one that must be determined in order that the rent may be closed and the peritoneal cavity washed out. The second is also formidable, not because of the immediate danger of a fatal result, but ultimately. I take it, no censure can attach to Dr. Reed. It is not stated whether he had symptoms, but possibly he did have extra-peritoneal rupture of the bladder, with perivesical hemorrhage continuing until it split off the peritoneum. The urine was not withdrawn; it crowded back in there, and caused ammoniacal fermentation.

DR. REED: The man was catheterized every day, and the normal amount of urine obtained, until the last few days, when the urine dribbled away of its own accord. I could not determine any urine in the wound, but the ammoniacal odor I attributed to molecular disintegration.

DR. JEPSON (continuing): I have seen cases where such a termination as that occurred from rupture of the bladder, the extravasation of blood being mixed with a certain amount of urine, with ultimate death. Such patients should be provided with means whereby the urine cannot accumulate there and be forced out into the blood. The blood is extravasated with the urine, and it may become partially absorbed or organized.

DR. H. G. WETHERILL, of Denver, Colo.: With reference to the interesting papers of Drs. Reed and Abbott, permit me to say a word or two in connection with the use of evaporation of fluids and the use of fluids in certain latitudes and under certain atmospheric conditions. Living in Denver, as I do, we have determined long since that evaporation takes place in that dry atmosphere and in that altitude very much more rapidly than it does at sea level. The value of the

application of the idea set forth by Dr. Abbott has been recognized to a large degree, because, as he has told us, it is the habit of surgeons of the present day to avoid in every way possible not only the handling of the intestines and abdominal viscera, but exposing them as little as possible. It is a common thing to-day, with the aid of the Trendelenburg position, to do elaborate operations in the pelvis and abdominal cavity without a single loop of intestine ever having come between the lips of the incision. Those are all points in the right direction. But I think when the doctor says the condition in which the patient may be is not due to loss of water, but to a loss of heat, he overlooks the fact that perhaps the loss of heat is due directly to the loss of water; to the slight evaporation which occurs from the surface, loss of animal heat is very largely due. This carries with it the practical application which we in Denver utilize as to the temperature of the room, the humidity of the room, and all those things which have undergone discussion in surgical societies for many years. We have definitely settled that a certain humidity is desirable in an operating room; that a certain temperature, not high, is desirable in an operating room. It was once thought that where the abdominal cavity was to be opened safely, a high temperature was desirable. Most of us feel that a moderate temperature, which is comfortable for the surgeon, a moist atmosphere, is really advantageous for the patient, if he or she, as the case may be, can be properly protected against exposure and against the rapid radiation of heat from the body. That brings up allusion to other practical points I would like to make in this connection, because they are practical points that bear on the loss of surface temperature. Surgeons place large packings about wounds, and put the patients to bed with wet bichloride dressings, from which rapid radiation occurs. We recognize to-day distinctly the use of wet packs, and it is a question whether they are not a distinct disadvantage, so far as the ultimate recovery of the patient is concerned, through the loss of body heat caused by the rapid evaporation of the moisture and the loss of heat connected with them. I venture to predict that the next generation will see the use of glass-top tables and modern aseptic furniture, as we see now in a great many elaborate operating rooms of to-day. We will have recognized the practical importance of maintaining every portion of body heat to the patient that can be maintained by some artificial means.

DR. DANIEL T. NELSON, of Chicago (by invitation): I have been very much pleased with the papers. Some of the ideas set forth in them carried me back a great many years to the time when I used some of the things mentioned in my early professional life. Speaking of the rubber bag and the use of hot water, I remember of having some time ago an unpleasant experience with it. Let me relate it to you. I applied a rubber bag containing hot water to a patient's back, and it was so hot that it burnt her, and I had more trouble from that source than I did from the ovariotomy

wound. So you must, if you apply a rubber bag containing hot water to a patient's back, be careful that you do not burn her, because the blisters you make in that region will not heal readily. If you apply a hot water bag to a patient's back, although the nurse can hold it there with her hand, you are likely to get a blister of the skin, and it may give you more trouble than a wound, because of the lowered vitality of the skin under the circumstances.

With reference to the Kelly pads, they were used long before Kelly graduated in medicine. A glass table, with a rubber bag under it, has been used for years in operating rooms, dry or wet. I saw Mr. Tait and Bantock operate in 1881, with so much moisture that one could hardly see the visitors. I happened to be inside the railing, as they thought I was clean, and the other gentlemen, who were outside the railing, were not allowed to come in, and one could hardly see them on account of steam.

Something was said with reference to not exposing the peritoneum any more than necessary. Why? When I studied physiology, I was taught that the peritoneum was a lymphatic cavity, and somebody has taught us since (I believe it is Crile, of Cleveland, Ohio) in his experiments on shock that trouble from exposure of the peritoneum occurs by reflex action; while Brown-Sequard taught us that reflex action was the cause of more trouble from peritoneal exposure than is the loss of heat. Somehow the sensitive organs are told that there is trouble going on. When we open the peritoneum, why do we have so much shock? Because we strike the sympathetic ganglia which disturb the heart and the lungs, as Crile has shown us. It is not the loss of heat; it is not the loss of blood or temperature, but it is the shock, and what do we mean by that? I confess, I do not know.

DR. REED (closing the discussion on his part): I have but a word or two to say. The first gentleman, who discussed my paper, spoke of the subject of rupture of the bladder in fracture of the pelvis. What he has said is true in many instances of fracture of the pelvis, namely, we may have a rupture of the bladder. In the particular instance I cited I was certain we did not have it. I have seen, however, rupture of the bladder without any fracture of the pelvis at all. I recall one remarkable case in which the bladder ruptured down through the perineum, with no fracture of the pelvis. I cannot account for it, but it is a fact.

The second gentleman (Dr. Wetherill) spoke of the loss of heat from wet packs. I admit that there is some loss of heat from the application of wet packs, but I believe, especially in higher altitudes (and I am a thousand feet higher than the gentleman in Denver), we have to use moist packs in order to get good and rapid repair. The benefit derived from the artificial preparation of moisure is greater than the loss of heat we obtain from the evaporation of steam.

DR. ABBOTT (closing the discussion): Just a word or two. My paper was written simply to bring out the fact of the

result of immediate exposure of the peritoneal structures. I did not go into all the other subjects which are related to it. If Dr. Wetherill will read my paper, after it is published, he will see that I have covered practically the same points that were mentioned by him.' But there is one point I wish to speak of, and that is this: Ordinarily, in the Trendelenburg position, we do cover the intestines, but we do not cover the rest of the peritoneum.

HOW SHALL WE TREAT SEPSIS FOLLOWING ABORTION OR LABOR.

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Every physician of any considerable experience has seen numerous cases of the above types of greater or less gravity, and no doubt all have some method of treatment. The very common occurrence of these infections and their too frequent fatal results lead me to think that many times proper treatment in the early part of the cases has been neglected, and often death follows when it might easily be averted.

Of course, we all now understand the great importance of surgical cleanliness in the early history of these cases, and that prevention, when possible, is better than cure. And I hardly need to urge before this body of intelligent physicians the duty of asepsis as a preventive measure. I shall not speak of the diagnosis further than to remind you that not all cases of fever following labor or abortion are due to infection along the genital tract, but such patients may, rarely, have fever from other causes, and these should not be overlooked. Neither is it necessary to speak now of the different varieties of infection, for while I fully indorse bacteriological examinations and heartily commend the work of those making investigations

along this line in hospitals and under suitable conditions, it is a fact that the large majority of these cases to-day must be treated without these facilities and that promptly. Delay in many cases is exceedingly dangerous and would mean death if prompt and efficient treatment were withheld pending a bacteriological examination, even if the most approved facilities were at hand for carrying it out. Hence, I would say that if a safe, easy and reliable method of treatment can be found, we should all be prepared with it and use it as soon as demanded. Thus we will get the best results and save the most lives.

The uterus, the broad ligaments and the vagina are abundantly supplied with lymphatics, the circulation is most free, the rectum and sigmoid with their poisonous contents are in close proximity and the peritoneum is a most active absorbent, so that all of these poisons, of whatever variety, may when present be quickly passed into the lymphatics, the circulation and the peritoneum, producing results more or less speedily fatal, depending upon the variety and amount of infection, its point of contact and its dissemination, together with the degree of local and individual resistance to the infection.

It matters not whether we have a sapremia, which is "a febrile condition due to the introduction into the blood of the chemical products of putrefaction"; or a toxemia, "a condition of contamination or poisoning of the blood"; or a septicemia, "an infective disease caused by the absorption of the septic products"; or a pyemia, "which is septicemia, with the formation of secondary or embolic abscesses." We always have in sepsis following labor or abortion pathogenic microorganisms or their products, the ptomains circulating

in the blood and giving rise to the untoward symptoms; and, further, the absorption of these bacteria or their poisonous products always takes place from some portion of the genital tract which has been recently and specially denuded so that its absorbents may easily receive the poison.

For, while Von Eiselberg has demonstrated both streptococci and staphylococci in the blood of septic patients, Rosenbach has shown that bacterial invasion of the blood is not at all essential to sepsis and concludes rather that septic symptoms are due instead to the absorption of poisonous ferments and ptomains. It has been wisely said that those who believe in the germ theory of pathology believe that "zymotic diseases are due to the presence in the body of living organisms * * * and produce their morbid effects by their vital activity, and probably in large part by the formation of poisons called ptomains." A recent writer in a carefully-prepared article says, "The presence of a foul odor in the discharge would justify the careful use of the curette. A culture should then be made of the discharge and the cavity thoroughly injected with hot sterile water or salt solution. In the absence of foul discharge the curettage should be omitted, but the culture should be taken and the preliminary injection employed. After twenty-four hours the culture growth will demonstrate the nature of the infection. If other than saprophytic, the curette must not be used. Streptococci are the most common and serious germs encountered in puerperal infection, but the same rule regarding the curette applies to others, such as the staphylococcus, gonococcus, colon bacillus, etc." I make this full quotation to condemn it for two special reasons. First, it is visionary and imprac-

tical at the present day in most cases. Second, if acted upon it would allow many women to die who might otherwise be cured by prompt and energetic treatment.

It should not be forgotten that whether the infection be by streptococcus, the staphylococcus, the colon bacillus, the gonococcus or saprophyte, death may result. True, some will produce that termination much more certainly and speedily than others; but since an immediate determination cannot be made as to what the outcome of the case will be if one temporizes, both scientific and humanitarian principles demand that prompt and as heroic treatment as safety will permit be at once instituted.

Lantas' article upon the treatment of abortion, approvingly cited in Gould's Year-Book, was a citation of 300 cases treated, of which twelve had fever and other evidences of sepsis. One case ended fatally. The treatment in all was to empty the uterus and cleanse with bichloride. In conclusion he says: "In all cases of septic infection complicating abortion, when either the whole or a part of the ovum is retained the uterus should be emptied as soon as possible and cleansed with bichloride solution. When septic infection persists after abortion, the total removal of the uterus, tubes and ovaries is indicated."

Vineberg says: "In every case of puerperal sepsis a thorough search for the original site of the infection, whether it be a wound of the perineum, vagina, or cervix, should be made, and, if found, it should be treated by surgical measures. * * * If by exclusion or otherwise, it is decided that the site is within the uterus, it should be subjected to a thorough curetting with the finger or preferably with the sharp curette." He claims that by this method of drainage and intra-uterine irri-

gation 95 per cent. of the more serious types of puerperal sepsis will recover and that of the other 5 per cent. some will require opening the abdomen and most will require abdominal hysterectomy. To this view I cannot assent, but hold that rarely, if ever, in these acute cases are we justified in doing an abdominal section. Vaginal section is often indicated and vaginal hysterectomy may be required, but abdominal hysterectomy almost never.

Goffe says: "The question or even the propriety of hysterectomy for puerperal sepsis has yet to be determined, as there is no affection in which it is more difficult to lay down general principles of action." True, we are not always able to make a diagnosis in such cases, but it must be clear to every medical man that a uterus the walls of which are filled with abscesses or infiltrated with pathogenic germs, through and through, and in which the tubes, ovaries, and broad ligaments are badly involved, should be entirely removed as early and as completely as possible. By this treatment alone can any of these patients be cured and more will get well after the vaginal operation than after any other.

Given, then, a true case of sepsis, see that the bowels are emptied, the vulva cleansed, the vagina and uterus thoroughly emptied and cleansed of all infective material, and all pathogenic germs within reach removed or destroyed, and your patient will get well provided only that the system is able to cope with the germs and poison already in the circulation.

Now, how shall this be accomplished? By means of calomel and salts to open the bowels, an abundance of soap and hot water to cleanse the vulva, the finger, sharp curette, abundance of hot water and pure car-

bolic acid to sterilize the vagina and get rid of all infective material and pathogenic germs within reach. All remnants of placenta, infected blood-clots and sloughing tissue, whether in the uterus or in the wounded cervix or vagina, should be gently but thoroughly removed and these raw surfaces wherever found freely swabbed with pure carbolic acid, even covering the whole inside of the uterus with the pure acid if symptoms at all serious are present.

No packs or dressings should be allowed in either the uterus or the vagina, but free drainage should be secured. I am well aware that many object to the use of the sharp curette, and think it better generally to use nothing but the finger. A well-known writer says: "In the great majority of cases it is wiser thoroughly to curette the uterus with the object of removing the whole of the decidua and retained products. There is no evidence that curettage, if done with every precaution, favors the spread of infection. In very virulent infection, early curetting, with the object of sterilizing the uterine cavity, affords the best chance of a successful result." I can heartily indorse these sentiments if you add the pure carbolic acid as a means of helping to secure complete sterilization of the uterine cavity. I am familiar with the fact that Bumm, the German pathologist, holds that under favorable conditions an inflammatory exudate is thrown out around the seat of invasion, which, aided by phagocytic action of the white corpuscles, prevents penetration of bacteria to adjacent tissue and the process is thus limited to a circumscribed area. Therefore Goffe and others teach that only in saprophytic infection should the curette be used, lest we break down Nature's wall of protection and open up these channels to more serious infec-

tion. But all admit that many times the bacteria break through this protecting wall and play havoc with the system. This fact must be patent to every physician. Else why give any treatment? Why do serious infections steadily and progressively grow worse? If Nature's barriers are sufficient to head off these most serious and virulent infections, why do patients thus afflicted persist in dying? And why is it that proper local treatment, even when it destroys these barriers, succeeds in saving lives and rescuing patients from the grave?

If you will but consider a moment the structure we are dealing with and remember that, in addition to blood-clots and remnants of infected placenta, we have, if the uterine cavity be infected by any pathogenic germs, a sloughing and infected lymphoid tissue which normally comes away in the lochia and which now remains a most favorable nidus for the multiplication of these pathogenic organisms, and this bed of poison cannot be adequately removed by the finger nor yet by the dull curette, you will readily perceive why it requires the proper use of the sharp curette. This with the sterilized douche carries away mechanically the most of the unhealthy micro-organisms and their nidus. Having done this and in a like manner treated all other raw surfaces in the cervix, vagina and perineum, take a swab of cotton dipped in pure carbolic acid and apply freely to all of these raw surfaces, and you at once seal up all absorbents and destroy all remaining germs. This is heroic treatment, but if well done is absolutely safe and certain to stop further infection along any of these channels. Some object to the use of the pure acid, fearing either poisoning by it or too deep caustic effect, but if your wound surface

is comparatively dry, so that the acid is not too much diluted by the secretions and blood or water, you get a superficial caustic effect and an albuminate is formed, sealing over the absorbents so that none of the acid passes into the circulation and no toxic effect can occur. Otherwise, the caustic effect is so superficial that no permanent damage can be done to the tissues, for no deep slough and no cicatrization or other serious changes take place in the deep structures. All of this is not mere theory, but actual fact which any one may observe in practice if he will take the pains to notice.

It seems strange that men who oppose the sharp curette in the graver forms of infection because, they say, you break down Nature's barriers and open up the parts to worse infection, and because, they say, paradoxical as it may seem, the infection has already entered the system and is beyond the reach of your curette or of your local antiseptics, should yet advise removal of uterus, tubes and ovaries, etc., by the vaginal or abdominal method. Why do all this and greatly increase the shock to your patient and render her less able to cope with the pathogenic germs already in the system? Such men will be compelled to answer that it is done with the idea of removing those parts which contain the point of invasion, together with the prolific bed of these organisms, the pathogenic germs and their ptomains, hoping thereby to remove mechanically so large a part of them that Nature, aided by the physician's internal medicines, may overcome those germs and their products which have already passed beyond the reach of his knife. I hold that this is their reasoning and it is sound. If sound and logical as well as scientific, why will not the same principles

hold when I urge that, at a still earlier period in the case, before the infection is so deep or widespread, all of these raw surfaces, including the inside of the uterus, be curetted thoroughly with the sharp curette, all of the superficial surface, which is the point necessarily first infected, being removed, then all debris washed away with sterile water, and the germs and their pabulum with their ptomains carried away by flushing? Then, because there will still be left some bacteria, which it is well known cannot be carried away, pure carbolic acid should be freely used to destroy those that remain and quickly to seal up all absorbents against further invasion.

It is not claimed that the curette gets rid of all pathogenic germs; it carries away multitudes of them and the superficial structures which are already so full of them and their ptomains that Nature cannot get rid of them, and we should give her prompt assistance by removing all of that tissue which she can readily spare and which is now a source of constant and increasing infection. Neither is it claimed that the application of pure carbolic acid (95 per cent.) will follow these pathogenic germs into the circulation and destroy them there; but it is claimed that it destroys all within its reach, and those in a superficial layer still left by the curette. What I insist upon is that this treatment, employed early, is not only justifiable and safe, but is curative and will avert the necessity for a hysterectomy later. Let this become the prompt and universal early treatment and these patients will generally recover, no matter what the variety of the infection.

To summarize the treatment let me say:

1. Remove early with the finger, sharp curette and

flushing all debris, decidua, blood-clots and sloughing tissue which may be infected, from the uterus and from all raw surfaces of cervix, vagina, and vulva.

2. Dry all of these raw surfaces and freely apply to them the 95 per cent. carbolic acid, washing away the surplus with sterile water.

3. Unless hemorrhage require, leave no tubes or packing of any kind in either vagina or uterus.

4. Have a simple carbolized, 2 per cent., vaginal douche used twice a day.

5. Open the bowels freely with calomel, ½ grain, every hour for four hours, to be followed by Rochelle salts until sufficient action has occurred.

6. Give quinine, 3 grains, every four hours, followed by tincture of the chloride of iron, 15 drops, in water.

7. Give good nourishment, with milk, eggs and stimulants every four hours.

8. Let this be the routine *early treatment.*

9. When fixation of the uterus occurs and infiltration takes place in Douglas' cul-de-sac or in the broad ligaments, or when the tubes or ovaries fill with pus in acute cases, open promptly and drain through the vagina.

10. If multiple abscesses occur in the uterine walls, if the walls become badly infected, or if necessary in order to secure perfect drainage for a badly-infected pelvic cavity, remove the uterus and all else necessary by the vaginal route.

DISCUSSION.

DR. JOSEPH EASTMAN, of Indianapolis, Ind.: Mr. President —After listening to the excellent paper of Dr. Henry, and being interested in this subject, I am constrained to ask the question, Have we an agent we can administer internally that will prevent sepsis? In a case of extrauterine pregnancy, in which exsanguination was almost present the secundines were allowed to remain after taking out nearly three quarts of pus from the abdomen. The patient was

placed under the influence of urotropin on the seventh day, without temperature, and the secundines removed. She was kept under the influence of urotropin until the fifteenth day, without any elevation of temperature. On that day the physician suspended urotropin, and in forty-eight hours thereafter the temperature arose to 103°; tympanites was extreme, and odor very disagreeable. The patient was placed again under double doses of urotropin, shortly after which the temperature declined to 99°, and she was kept under it until the wound was thoroughly closed and recovered without trouble.

Again, in a case of labor, a portion of the afterbirth was allowed to remain by the physician who had charge of the case. The patient was placed upon urotropin, which was continued for several days, then stopped, and the patient died in forty-eight hours thereafter from sepsis. She had no temperature whatever.

This agent I have used in some fifteen cases of puerperal sepsis, and in every case, within forty-eight hours, the temperature has been reduced to 99° or thereabouts, the patients recovering. How does this agent act? After studying its therapeutic action for a long time, I hit upon formaldehyde, which you know cannot be taken into the system in any form, but in the form of salt of ammonium it is as inert almost as urotropin. It must be some substance which will dissolve that becomes antiseptic. Put a person who has a septic condition of the bladder, such as we have spoken of to-day in cases of hypertrophy of the prostate, under the influence of urotropin and in twelve or twenty-four hours the urine will be clear. You can push urotropin up until you get one-quarter of one per cent. in the urine. You can get the toxic effect of it, and the first indication is irritation of the bladder; the second, lowering of temperature. I have known the temperature to drop three degrees below normal within three hours after its administration. Furthermore, there is a lowering of the pulse, the pulse declining 30 beats or more after the urotropin is dissolved. When brought in contact with pus, or any pathogenic germs, urotropin dissolves at once, and formaldehyde is given off freely. Inside the body it unites with the constituents of the body, acting as an antiseptic. Take pus in a test tube, and add about one-quarter of one per cent. of urotropin to it, and in less than half an hour it will be dissolved in water, and the bacteria will be in the bottom of the tube.

DR. H. G. WETHERILL, of Denver, Colo.: In certain particulars my technique and plan of treating abortion or retained secundines after abortion do not agree with those of Dr. Henry, particularly in regard to the danger of the curette. We have to meet certain general indications that must be met, namely, the removal of the foreign body that may remain by some method, or the use of instruments, and cleansing the cavity of the infected material which has been left behind. To this end, I think I can make a suggestion which will not be new to many of you to further the purpose already carried out by Dr. Henry, and improving it in many

particulars, and that is to follow the use of carbolic acid with continuous irrigation with alcohol, adapting to this infected condition in the uterus exactly the treatment which Dr. Phelps, of New York, has applied to tubercular hip disease, and to other infected cavities. This treatment has been applied by some of my professional friends to old infections in the antrum of Highmore, with absolutely satisfactory results; that is, wiping out the infected cavity with pure carbolic acid, then, after it is allowed to remain for a minute and a half, irrigating the whole cavity with pure 95 per cent. alcohol, or alcohol diluted to less than 25 per cent. A good plan to carry this out is to pass a soft catheter clear to the fundus, pack it lightly with gauze, instruct the nurse to throw into the catheter once every hour or two hours a certain amount of pure alcohol. The alcohol neutralizes the caustic effect of the carbolic acid. I should be very much afraid of making large applications of pure 95 per cent. carbolic acid to a large uterus, which has become well advanced in pregnancy, leaving it there, without any neutralization with alcohol. I should be afraid there would be great danger of poisoning. If there be an excess of carbolic acid, the early application of alcohol will obviate that danger. In addition to that, we have the continuous antiseptic effect of the alcohol itself, which is a most excellent remedy. Perhaps, if I may make an analogue and reverse the condition somewhat, I will say that instead of putting the specimen into alcohol, we put the alcohol into the specimen. One of my associates had a case of this kind in which he curetted two or three times, the case having been practically abandoned. He applied continuous irrigation with alcohol in this case, and not only succeeded in saving the patient, but in order to do so for the first twenty-four hours he kept her in a condition of more or less alcoholic intoxication from the absorption which had taken place in the uterus.

DR. DONALD MACRAE, JR., of Council Bluffs, Ia.: I wish to say a few words in connection with Dr. Henry's paper, and particularly with reference to the sharp curette. I do not think it is a good plan in some of the cases we are discussing to use a sharp curette for removing the membranes that are retained inside the uterine cavity. We have all seen cases in which, after introducing the finger into the uterus, and cleaning out the cavity, the temperature of the patient has declined to normal in a few hours. In another class of cases we get a uterus that is absolutely clean, yet the fever continues, and we do not know the cause of it. We do not know exactly what the true condition is. We can say it is caused by infection, but we do not know the true nature of it. There is elevation of temperature, yet the uterus is clean. There is no odor, no discharge from it, no foreign bodies in it. I believe, after cleaning out the uterine cavity thoroughly with the finger or dull curette, removing all foreign substances, and applying carbolic acid in the manner that has been suggested, with alcohol, we will have a good result.

DR. J. N. WARREN, of Sioux City, Ia.: I have been very much interested in this paper, although I do not believe in some of the doctor's teaching, namely, to use a sharp curette in an infected uterus. When we consider the anatomical condition of the uterus, it is practically impossible to remove every fibre of tissue, whether we use a sharp or dull curette. If we use a sharp curette, we are liable to add traumatism by removing the mucosa which is not infected, and we have this rapidly absorbing area which we did not have before. It seems to me, if we use a dull curette, and then thoroughly wash out the uterine cavity, we have done everything that can be done, so far as the removal of necrotic tissue is concerned. It makes a great difference as to what a bacteriological examination of the material removed will show. If you have a saprophytic infection, you have a stinking discharge, which can usually be gotten rid of by means of sterilized water. On the other hand, if you have staphylococcic infection, you have a different condition to contend with. The patient may die. The trouble is, that you have not only absorption through the lymphatic system, and channels that pass off from the cervix and fundus, and within the fundus, but you will find in some cases you have infection of the inguinal glands. I believe with the gentleman from Denver, who said that after we have curetted the uterus carefully, washed it out, and made application of carbolic acid to the entire surface, it is better to neutralize the acid with alcohol. I have never used continuous or interrupted irrigation with alcohol, although I can conceive it to be an admirable method.

DR. B. B. DAVIS, of Omaha, Neb.: Just a word or two in reference to the disease we are trying to treat. I can conceive in those cases of sapremia, where we have no infection in the circulatory fluids at all by microorganisms, but merely the absorption of toxins that have been produced in the uterus by the putrefactive changes, a simple curetting, done as gently as possible, is a good thing, and will accomplish a great deal. But if we have a true septicemia, I do not believe we can relieve the patient very much by using either a dull or sharp curette in the uterus, or even where we take out the uterus. I can also conceive if, in treating a sapremia, where the microorganisms are still confined to the uterus itself, you use a sharp curette carelessly, without the proper immediate use of antiseptics, that you can convert a simple sapremia into a septicemia by opening the tissues there and getting rapid absorption of the microorganisms. If we take a curette in our hands in those cases where we are sure in our minds we have a true septicemia, but may have a sapremia, we are taking great responsibility. We all do it, but at the same time I am strongly impressed with the fact that we may produce a great deal of harm, and do a great deal more harm than good by the use of the curette.

DR. HENRY (closing the discussion): I wish to thank the gentlemen for their free discussion of my paper, although I did not suppose any of you would agree with me. I wrote

the paper for the purpose of bringing out the different views on the subject, and nearly all those who have spoken against the method have not tried it. I have been using it for four or five years, and I have not had a fatality. This counts for more than all the theories you can give me. I believe I am the only man in Omaha who treats these cases of sepsis in the manner I have indicated. I give the treatment to you for what it is worth. I know it is practical, and patients get well.

A good many men in curetting the uterus do not do so thoroughly; they curette perhaps only one-half of the uterine cavity, leaving behind debris which serves to keep up the infection. In such cases in which I have been called, after thoroughly curetting the uterus and applying acid, I have seen the temperature drop within twelve hours to almost normal.

One gentleman cited a case which confirmed what I said about opening the abdomen. In the acute cases of infection the majority of practitioners will lose their patients, I don't care who they are. In some cases the odor may be slight, yet the infection is serious. In other cases, where we have decidedly marked odor, we have less infection to contend with; yet we want to get rid of the infective material.

Objection has been raised to the use of the sharp curette. I have not in a single instance had to use the sharp curette a second time, and there is no need to do so if one does his work thoroughly the first time. I believe one is just as liable to produce traumatism of the uterus by using a dull as a sharp curette. We use the curette for the purpose of getting rid of the infective tissues. The infection comes from the raw surfaces in the vulva, the vagina, the cervix, or uterus itself. I do not make these raw surfaces by the use of the sharp curette; they are already there, and the tissues are doomed to infection of one kind or another. I clean out the infective material, render the uterus absolutely clean, and then apply acid to counteract the effect of any poison that may have escaped my finger or curette.

I ask you to try the treatment I have outlined early in your cases of sepsis, and I promise you that you will have good results.

OUR HOSPITALS.

By H. D. NILES, M. D.,

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GYNECOLOGIST TO THE HOLY CROSS HOSPITAL.

The evolution of the hospital—including the growth and development of hospital work—has, in recent years, been so rapid and so far-reaching that comparatively few people in or out of the profession realize that these

institutions have already become one of the most potential factors in progressive medicine, and that the time is not far distant when they may exercise an influence over the destiny of medicine greater than all others combined.

Originally intended by their benevolent founders simply as temporary homes where the sick poor might secure proper medical care and nursing, the peculiar advantages of hospital appliances, methods and nursing soon became favorably known to all classes; good men early became identified with the enterprise; medical students sought these places for clinical instruction; people of means contributed to their support and the hospital enterprise continued to grow in prosperity and usefulness.

Hospital boards and the general public, who have been content to measure this prosperity and usefulness by the number of patients treated, the lives saved, and sufferings mitigated in a given period, are well satisfied with the results and see no occasion for changes in methods or purpose. Such an estimate is manifestly inadequate, since the largest and best part of a hospital's good work can not be thus computed or even comprehended by the non-professional mind.

Even the profession as a whole, each member of which employs in his daily practice, methods of diagnosis, means of treatment, operative procedures, bacteriologic and microscopic data, and statistical information derived directly from the hospital, is prone to underestimate the power the hospital possesses as a promoter of medical progress or the good it accomplishes in the cultivation of a spirit of scientific investigation and in furthering the efforts of good men to advance medicine. It has been said, and I think truly,

that if we as physicians should forget all the knowledge gained by the past fifty years of hospital achievements, medicine would be set back at least a quarter of a century, while to eliminate the hospital's influence upon progressive medicine for the next fifty years and depend upon individual work alone would mean the return of empiricism.

The general practitioner who is, has been, and I trust always will be, regarded the highest type of physician, and who comes into contact with the largest proportion of human sicknes and suffering, must now confess his dependence upon his hospital colleagues, or fail in doing his full duty to his patients. It is preposterous for any one individual to claim to be able to attend to a large practice, keep himself in touch with the best thoughts in general medicine, surgery, and the several specialties, and perfect himself in bacteriology, microscopy, hematology, X-ray work, pathology, and certain unusual operative procedures, and at the same time conduct the laboratory work incidental to such a practice.

He might, if quite frank, confess further that it is from his association with these workers in their special fields, his acquaintance with their methods and lines of thought, and the original researches and discoveries made in their laboratories, that he receives a large part of his practical knowledge and skill and his greatest inspiration to advance in his professional studies and work.

This is distinctly an age when great combinations of special forces rule the world, control all its enterprises, and govern the destinies of every undertaking of any magnitude. In medicine there is to-day a greater need for an exhibition of this same progressive spirit of the times than ever before. We must combine, our special

forces if we are to meet the necessities of the new existing conditions. For now as never before, it is apparent that our next great advances are to come from and will be dependent upon those researches, experiments, investigations and studies that can be prosecuted only where an abundance of clinical material and painstaking laboratory work are associated; where the clinician and operator can be in the closest touch with the bacteriologist, microscopist and pathologist; where the practical conclusions of the experienced man may be fairly compared with the theoretical deductions of the recent graduate; where the views of the skilled specialist and the general physician and surgeon are broadened by frequent consultations; where trained assistants and needed equipments are provided and it is possible to have accurate records kept and reliable statistics compiled. This combination is essential to our future progress as well as to our present efficiency, and can be provided only in our hospitals and through the labors of such hospital workers as are willing to concentrate their thoughts and limit their efforts to a narrow part of the great field of medicine, and leave to the general practitioner and family physician the wider and more practical application of the sum of their united labors.

It is very evident to the minds of medical men familiar with the situation that the methods and management that have served our hospitals so well when their purpose was limited to the care of the sick within their walls will not suffice if our hospitals are to meet our present needs and fulfill their possibilities as a great system of scientific institutions distributed throughout this country, where not only the favored few but the whole profession with all the sick intrusted to their

care may feel the results and participate in the benefits. It is not enough that our hospital authorities provide and equip rooms where a promiscuous assemblage of physicians may be permitted to occupy their leisure moments trying to sustain the scientific reputation of their institution by unsystematic and irregular work.

We need to be as methodic, discriminating and earnest in our efforts to establish and maintain a truly scientific institution as those who control and direct our other institutions of learning. Our needs are somewhat similar and quite as great; and it is fair to presume that if much the same methods were applied with equal judgment the results would be as satisfactory.

Viewed from this standpoint, the staff would also be the faculty; the departments would be transformed into definite and distinct realities, each presided over by a member of the staff, who would be a specialist. The positions would be filled by men selected less on account of their personal popularity and more because of their proficiency in particular lines and devotion to certain branches. The size of the hospital staff would be reduced to conform to its actual needs as a scientific institution, for upon its standing as such, more than the bulky size of its staff, the hospital would depend for a following. The staff perfectly adjusted to the hospital's requirements would bring a harmony of action, a unity of purpose, and a general effectiveness not conspicuous in the large, unwieldly staffs of to-day.

So long as a hospital measures its own usefulness by the number of patients treated, the standing of each member of the staff will be estimated largely by the size of his personal following; and the commercial spirit will rule both the institution and the individual to the exclusion or great detriment of scientific work.

It so happens that many hospital men are engaged in special lines of study and investigation that prevent their attracting or attending many patients; yet the immediate and remote results of their work may be of the utmost importance to progressive medicine. These men deserve and should receive every encouragement; and it is manifestly unfair that their positions, income or professional standing should be dependent upon the number of patients they bring to the hospital. One of the effects of introducing the educational feature into our hospitals would be a more equable adjustment of credit and remuneration, so that the laboratory worker as well as the operator would be fairly appreciated and compensated.

Our hospital statistics are already quite an important factor in medical literature, but with the scientific spirit prevailing over the commercial, the records of the work and achievements of these institutions might, and I believe would, exercise an influence upon medical thought greater than all others combined.

But the fixing of a new purpose upon an old institution under the control of kind and well-meaning friends, who are content with the old aims and distrustful of the new, will require something more than college methods or college training. The medical profession can not reasonably expect to have much of a voice in this or any other reform measure until they revolutionize their present business policy and methods.

The prevailing ideas deprive them of not only the proper recognition and the adequate pecuniary recompense, but of the legitimate influence that justly belongs to the faithful and effective work of a learned profession. For this unfortunate state of affairs we can blame only our own defective business foresight and

tact, since for years we have been educating and drilling the people to think lightly of our work, our comfort and our aspirations.

In the most prosperous country in the world, where the public is abundantly able to bear all its burdens, even to caring for its sick poor, the members of the medical profession, in and out of the hospital, have at all times, with and without provocation, held themselves up as shining targets for the impecunious, the mean-spirited and the unscrupulous to practice their impositions upon. They have sought out and assumed unnecessary responsibilities and cares without pay or reward. When in need of public or legislative aid they have intuitively and invariably attached themselves to the side of the minority. Individually and collectively they have rarely missed an opportunity to demonstrate their business incapacity. For many years the business methods of the profession have apparently served but one useful purpose, viz., as an example for the youth of our country to shun; and it is a significant fact that the only organization to-day that has thought well enough of these methods to adopt them is the Salvation Army.

Is not the physician who gives $25,000 worth of his services to the hospital entitled to the same consideration as the rich benevolent layman who donates his $25,000 in cash? Should not the ten physicians who thus contribute $250,000 receive the same recognition that is accorded the multi-millionaire whose gift of a quarter of a million costs him no real sacrifice of time or enjoyment? Fairly estimated, do not our services justly entitle us to a voice in all professional questions in and out of the hospital, second to none, even to that of those benevolent individuals, charitable organiza-

tions or religious societies that founded these institutions?

If we are ever to secure this voice—and we need it now—we must formulate and adopt a business code that shall not only meet the highest requirements of the ethics of the profession but at the same time command the respect and win the confidence and support of this twentieth century public.

It must be admitted that a very considerable majority of the profession is not in close sympathy with our hospitals at present, and not a few are disposed to regard these institutions as the abiding place of a favored few where the outside physician may contribute much and get little in return. Awaiting a fair and amicable adjustment of these differences, imaginary and real, and the securing of the cordial co-operation of the united profession, all these physicians and their patients are deprived of available hospital advantages, of which they are in the greatest need, and our hospitals are denied the very support most essential to their greatest success. In deciding such cases—and they should be decided—the common interests of the many should outweigh the individual interest of the few, and each of us should be willing to make any reasonable sacrifice or concession in the interests of our profession, our patients and our institutions.

Time will not permit our dwelling upon the many obstacles that threaten to retard the advance of our hospitals to the exalted position they can and should occupy, but among the most important questions that call for solution may be mentioned:

1. How shall the financial and professional relations between our hospital men and our general practitioners be adjusted so that all may be interested in the welfare

and participate in the benefits of specialized hospital work?

2. Is there any good reason why our hospital men and hospital authorities—sheltered as they are behind a strong combination—should be exempt from the application of the same "Code of Medical Ethics" that governs the conduct of the profession generally?

3. Is the general practitioner to have any place in the hospital of the future?

4. Is the specialist of the future to have any place out of the hospital?

5. Do we not need more hospitals and fewer colleges; better doctors and fewer graduates?

6. In the present state of our knowledge, when the life and health of our patients so often depend upon special knowledge and skill or nursing, is any physician justified in assuming the responsibilities of a general practice except he be in touch with some hospital or hospital worker?

7. In view of the important relations our hospitals are destined to hold with progressive medicine, is it not about time the professional mind began to dominate in the control of these institutions?

These are a few of the many questions that are suggested to the minds of all who thoughtfully consider the hospital work of the past and present and are led to appreciate the marvelous possibilities of the future.

The object of this paper is not to volunteer instruction, but to arouse, if possible, a more active interest in an institution that promises with our aid to become one of the most influential elements in the medical world—its labors, its literature, its thought, its discoveries and its advances.

"How are our hospitals to meet the needs of modern

medicine?" is, to my mind, the most important question before the profession to-day. I am quite aware that its satisfactory solution will not be the work of a day, nor of a single individual, nor of any clique or society of physicians; but I do believe that the medical profession as a whole, if united and determined, can decide upon and dictate an answer that should render the achievements of this twentieth century the most memorable in the history of medicine.

DISCUSSION.

DR. DANIEL T. NELSON, of Chicago: Mr. President—I began my hospital experience six months after I commenced the practice of medicine. This was in 1862. I am still engaged in the work. I have one solution for this troublesome question of medical ethics, and it is as old as the Christian centuries. It is simply to do as you would be done by; or, do not do as you would not be done by.

The relation of the country doctor to the medical practitioner in the city has been raised. I have had no trouble at all with the country doctor. I have received lots of good advice from him. I find many, many country doctors who are not connected with colleges, and others who are not connected with hospitals, and yet they know more than we do about certain things. I can always learn from the country doctor, for he has his wits at his fingers' ends.

DR. B. B. DAVIS, of Omaha, Neb.: I was much pleased with Dr. Niles' paper. He has dealt with questions that are live issues, although I do not believe there is any real controversy between the hospital doctor and the general practitioner. I realize the fact that there is a sort of barrier which seems to be set up, which is artificial, between the two. I think probably it is largely dependent sometimes upon the self-consciousness of the hospital man, and, moreover, there is a misapprehension on the part of the general practitioner. In taking hospital cases when they came in and offered themselves as charity patients, I have tried to ascertain, as far as I could, whether such patients were really objects of charity. We have no right to treat a case in a hospital as a charity case if the patient is able to pay his own family physician for treatment. Right there is one of the things which we ought to control a little better. I believe some hospitals have adopted the plan never to admit patients as charity patients unless they furnish certificates from some physician or physicians to the effect that they are objects of charity.

As to the relations existing between the lay board of managers of hospitals and the medical staff, these are sometimes an important factor, but I think I am safe in saying that

out in Omaha there is no controversy between the two. I think, as a general rule, laymen who have to do with the hospitals are ready and willing to take the advice of the medical staff, and they will adopt their plans, so far as the finances will permit.

This question is a live one, and should be discussed more freely in medical societies, so that we may arrive at some more universal method of dealing with hospitals.

A CONTRIBUTION TO THE SURGERY OF SPINA BIFIDA.

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It will not be the purpose of this paper to enter into an exhaustive discussion of spina bifida, nor can I present anything new regarding it. It is presumed that you are all familiar with the characteristics of this anomaly, and the object of this article is simply to emphasize some important facts in its treatment and to insist that those cases which are susceptible to operative relief be given the chance which has been too frequently denied. Spina bifida, occurring as it does about once in every 1,000 births, is the most common congenital deformity of the spine, and the frequency of its occurrence, together with the distressing symptoms occasioned by it, render it a subject which is entitled to the most serious consideration. This anomaly is usually found associated with some other deformity or deformities, due to arrest of, or imperfect, development, and is usually due to a defect in the vertebral arches. Whether this defect in the arches is primary, or is occasioned secondarily by inflammatory effusion and increase of fluid in the vertebral canal, is not known.

While the etiology of this deformity has not been definitely settled, and is still more or less in dispute,

the most rational explanation of its causation seems to be that which assumes the defect in the vertebral arches to be primary. The ossification of the bone covering the spinal cord occurs by four centers,—two for the body of the vertebra and one for each lamina,—the laminæ uniting in the median line. If the laminæ fail to unite, a defect in the bony casing of the cord ensues, through which the protrusion of more or less of the tissues of the cord may occur. The gap thus formed is frequently quite extensive.

Varieties of Spina Bifida.—There are five varieties of this deformity, grouped as follows:

1. Spina bifida occulta, in which there is simply a vertebral cleft, without any protrusion of the cord or its membranes. The skin over the defect is usually covered by quite a growth of hair, and is sometimes markedly dimpled. There may be no other evidence of the deformity, but frequently will be found associated with it club-foot, more or less anesthesia, perforating ulcer, and other trophic disturbances of the lower limbs. Paraplegia and loss of control over the sphincters have also been observed.

2. Meningocele.—In this variety the membranes of the cord protrude through the vertebral defect, the cord proper remaining in the spinal canal. Here the tumor may be the only symptom. Frequently other symptoms exist, such as hydrocephalus, more or less paralytic disturbances of the legs, and the tumor is often exceedingly tender to the touch. According to the report made by the committee of the London Clinical Society, this variety constitutes about 8 per cent. of all cases of spina bifida.

3. Meningomyelocele.—In this class are placed those cases in which there is a protrusion of the cord and its

coverings. The tumor wall is composed of skin and dura mater lined by the arachnoid membrane, its cavity being continuous with the subarachnoid space. When low down the cauda-equina will be found spread out over the sac wall and intimately adherent to it. If the protrusion is higher up in the spinal column, the cord will be found running along its posterior wall, the nerves running along its inner surface to the intervertebral foramina, or even passing directly across the cavity. This is by all odds the commonest variety of spina bifida, being present in about 62 per cent. of reported cases. Nervous and paralytic symptoms are the rule with this variety.

4. Syringomyelocele.—This is a very rare form, in which the cavity of the sac is formed by the dilatation of the central canal of the cord, the wall thus containing, or rather being composed of, the cord and its coverings to even a greater extent than the former variety. According to De Ruyter this form is usually lateral.

5. Myelocele.—This variety is characterized by the absence of the skin over the bony defect and the direct communication with the surface of the body of the central canal of the cord accompanied by a free discharge of cerebrospinal fluid. This is also, fortunately, a very rare form of the deformity.

Clinical Features.—In considering the clinical characteristics of the deformity only those forms marked by protrusion of some of the elements of the cord will be considered, or in other words those accompanied by a tumor, meningocele, meningomyelocele, and syringomyelocele. These tumors all contain fluid which is identical with the cerebrospinal fluid. In by far the greater percentage of cases, the tumor is found at the lower part of the spinal column, in the lumbo-sacral

region, and nearly always in the median line. It may, however, be found in the cervical region. The size of a spina bifida varies from a small swelling, as large as the end of a thumb, to one as large as the fist. They may differ very materially in external appearance. At times they are very tense, with the overlying skin so extremely thin that it seems it must burst. Again they may hang more or less loosely, and the skin be thick and corrugated. The tumors also vary in color; some are dark red, in some the color is the same as that of the surrounding skin; I have seen a case in which the color of the swelling was a sort of blue-black. The skin may only cover the lower portion of the swelling, the covering of the upper half being very thin and consisting only of the membranes of the cord. Ulceration of the overlying skin is often found. These tumors are usually sessile, may be somewhat pedunculated, are more or less spherical in form and fluctuating. I have seen a case in which the absence of fluctuation, together with a loosely hanging, thickened sac situated in the cervical region which gave no impulse on crying or coughing, rendered the diagnosis more than usually difficult.

The defect in the arches of the vertebræ may or may not be felt. It varies in size from a small cleft which will scarcely admit the finger tips to a large, wide furrow. The size of the cleft does not determine the size of the protrusion which may exist in any given case. Usually associated with these cases are found other congenital malformations, club-foot, usually talipes calcaneus, and hydrocephalus being most common. Various nervous disturbances may also coexist, paraplegia, loss of sphincteric control, anesthesia, and trophic ulceration of the lower extremities.

Diagnosis.—As a rule, the only difficulty attending the diagnosis of spina bifida consists in determining to which of the varieties it belongs. That this differentiation should be made is important, as the prognosis will be influenced by it, the prospect of a favorable result being much better with meningocele than in the other forms.

A meningocele may hang more or less loosely, the impulse is not so marked and the flattened bands of the cord cannot be seen in the sac wall, nor can their shadow be discerned by transillumination; this last sign, however, is not always reliable. This variety of tumor is more frequently found at the upper part of the spine than the other forms. Paralytic and nervous symptoms are not nearly so constant as in meningomyelocele or syringomyelocele.

Meningomyeloceles are characterized by paralytic and nervous symptoms below the growth. They are rarely, if ever, situated high up in the spine, and usually some of the flattened elements of the cord can be made out in the sac wall, or by transillumination the nerves crossing the cavity may produce a shadow. The sac of this cavity is frequently dimpled, or its center may be even marked by a furrow due to traction upon it by the attached cord. Fluctuation in these tumors is always marked.

Syringomyeloceles are with difficulty distinguished from the last named variety. They, too, are always accompanied by or associated with congenital deformities and nervous disturbances of the legs. Tension within the sac is usually extreme and ulceration of the overlying skin may be present. Hydrocephalus accompanies this variety more frequently than the others. Pressure upon the sac wall in this class produces posi-

tive signs of cerebral disturbance more readily than in the other varieties.

Prognosis and Treatment.—The prognosis of spina bifida is necessarily a gloomy one, as many of the children die early from marasmus, septic meningitis, convulsions, etc. I believe, however, that the mortality rate may be considerably reduced if a more hopeful view be taken of the situation. Too often the physician upon recognizing spina bifida regards the case as past all hope. Many of these children may be spared for more or less useful lives by surgery properly applied. I have heard surgeons say that it would be a blessing if every case of spina bifida died at or immediately after birth. That is a phase of the subject that is out of our jurisdiction, and the fact remains that a good many of them do not die and are brought to us for relief.

In considering the prospects offered by surgical intervention in this most unfortunate class of cases we should not be unmindful of what the future has in store for them if no assistance is offered. The greater number succumb in a few months or years to some of the many dangers which of necessity accompany the condition, and during the interval have endured a living death, the source of much anguish to their parents and untold misery to themselves. Mindful of this, we should not be too easily deterred by the unfavorable statistics so often quoted to demonstrate the futility of attempts to cure. I do not believe that a properly conducted operation can possibly render the condition of these patients any more unattractive. There is always the prospect of relief which may be secured in no other way, and if this hope is not realized, nothing has been lost by the attempt, as death is usually the inev-

itable result in neglected cases. In short, patients afflicted with spina bifida have everything to gain and nothing to lose by accepting the chance for relief offered by surgery, and it was to urge that this chance be more frequently offered that this paper was written.

In considering the operative treatment of spina bifida, ligation of the sac, galvano puncture, and the employment of setons may be at once thrown aside as unsurgical. We then have left two methods, excision and injection of Morton's fluid. Several years ago the committee appointed by the London Clinical Society to report upon the best method of treating spina bifida, after considering the statistics of many cases, reported in favor of injection of Morton's fluid. For some time this plan of treatment was given preference, but as many cases subsequent to injection developed hydrocephalus and as many others were either unimproved or died, excision grew gradually in favor, until to-day it is the method of choice and is, in my judgment, the only one to be seriously considered, as by it we can release the nerve elements from the sac wall and restore them to the canal with no greater mortality than accompanies the incomplete treatment by injection. By excision we mean the removal of the excessive skin and meningeal membranes, the separation of the nerves, if present, from the sac wall, and their restoration to the spinal canal. In performing this operation the most rigid asepsis is a sine qua non, and owing to the location of the tumor at the lower part of the spine extreme precautions to secure it must be taken. Central incision over the sac should never be made, as by it the cord might be injured. As the redundant tissue of the sac is to be removed, an elliptical incision should always be employed through the

skin, leaving just enough skin on each side to effect good approximation after the removal of the tumor. The incision of the membranes should not be made in the same plane as that in the skin, as a precaution against the subsequent leaking of cerebrospinal fluid. The membranes having been opened, if the case is one of meningocele, there are no nerves present in the sac, and the redundant membrane having been removed the meninges are closely sutured with fine catgut. If the tumor be a meningomyelocele or a syringomyelocele, upon opening the sac and evacuating the fluid we will find nerve elements spread out over the sac wall and closely adherent to it or running across its cavity. We may find the cord flattened and adherent to the posterior wall of the sac. These nerve elements are to be freed from their attachments and returned to the spinal canal, and the remaining superfluous tissue of the sac cut away. During the dissection of the nerve from the sac wall it is advisable to prevent the escape of cerebrospinal fluid by plugging the upper end of the canal with gauze, as suggested by Pearson. The meninges are then closed by suturing with fine catgut.

Now the question as to what to do with the bony defect of the spinal column arises. Various osteoplastic procedures have been suggested for its closure. If any of the laminæ are present, they may be loosened laterally and drawn inward over the gap. In the sacral region a thin layer of bone has been separated still attached to the periosteum and placed over the defect.

Bone grafting has often been employed with success, and the defect thus closed; the most popular material being the scapula of a rabbit.

In the cases operated upon by me no attempt was

made to close the opening in the spinal column with bone, but the muscles lying on either side were loosened so that they could be drawn in to the median line and sutured over the gap with chromicized catgut. This method of closure proved perfectly satisfactory in each instance, although in two of the cases the defect was quite large. The skin is then sutured over the muscle and sealed with iodoform collodion. The dressings should be small and frequently changed that they may not become soiled, as asepsis is absolutely essential to a good result. The results secured by incision are constantly improving and warrant its more extensive employment. In meningocele about 80 per cent. of recoveries have been secured, this being the simplest and most favorable variety.

Excision of meningomyeloceles was formerly condemned in most sweeping terms, and it is only in the past few years that it has been established as a justifiable procedure. Statistics concerning it are widely at variance, but as nearly as I can estimate, the operative recovery is about 50 per cent. and the functional about 15 to 20 per cent. Syringomyelocele may be classified with meningomyelocele. Myelocele and spina bifida occulta are not benefited by operation and must be treated palliatively.

The results as announced above, together with the hopelessness of the case if let alone, warrant an attempt to afford relief to the little sufferers from spina bifida of the meningocele, meningomyelocele and syringomyelocele varieties, unless distinct contraindications, among which may be mentioned hydrocephalus, septic condition of the sac, and extreme prostration of the patient, are present. Ulceration of the sac need not be a contraindication to excision, as by the

application of carbolic acid, followed immediately by alcohol, it may be rendered aseptic. I desire to briefly report four cases of spina bifida treated by excision.

CASE I.—Male infant, aged six months, with a large, tense, fluctuating tumor, in the lumbo-sacral region. The tumor, which had been present at birth, was in the median line about the size of an orange. The overlying skin was so very thin that it seemed it must rupture on the slightest pressure. A marked impulse occurred in the growth when the child cried. The slightest manipulation of the tumor caused intense pain, and the child was growing weaker and more fretful from day to day. There were no paralytic symptoms present. The absence of any symptoms of paralysis, and the fact that although the sac wall was almost transparent no fibers of the cord could be seen running through it, determined the diagnosis of meningocele. As the child was rapidly losing ground an immediate operation was advised, to which the parents consented. Under chloroform, an elliptical incision was made around the base of the tumor and the sac dissected free down to its connection with the cord and amputated at this point (about one ounce of straw-colored fluid escaping) and the membrane closely united with fine catgut sutures. The muscles lying on either side of the gap in the spinal column were loosened and sutured together in the median line with chromicized catgut. The skin wound was then closed and sealed with iodoform-collodion. Recovery was uneventful. The change in the disposition of the child was as remarkable as that in its general health; from a cross, fretful baby, pale and emaciated, it was in two weeks' time transformed into a fat, laughing infant.

CASE II.—A female infant, aged four weeks, was brought to me by Dr. Evans, of Emerson, Neb. Over the fifth cervical vertebra was a small tumor presenting unusual characteristics. It hung loosely in the median line from a broad pedicle, and in color resembled the surrounding skin. The overlying skin of the tumor was thick, wrinkled and corrugated, giving it much the appearance of a small scrotum. Fluctuation could not be detected, and when the baby cried, which it did lustily whenever the growth was touched, no impulse was perceptible. This infant was also losing weight and strength and the tumor was very painful, the slightest touch or pressure upon it causing the child to cry for several minutes. The position of the growth in the median line, and its extreme tenderness, were the points upon which the diagnosis of spina bifida rested, and the looseness of the sac and the absence of paralysis indicated a meningocele. Operation was advised, to which the parents readily agreed, as it was evident that the child must soon be relieved. Under chloroform, an elliptical incision was made around the growth. The skin being incised, the membrane of the sac was revealed beneath it. This sac was dissected free down to the cord and amputated, a very small amount of fluid escaping. It was found that the communication of the sac with the cord had been obliterated, or practically so, as only a very minute opening remained in the membrane at this point, and I think that it had been reopened by the manipulation. There was no escape of fluid through it. One fine catgut suture was placed at this point to ensure its closure and the skin wound closed. As the defect in the spine was very small no attempt was made to close it. Recovery was uneventful, and the relief to the child

was as complete as in the former case. The obliteration of its communication with the cord explained the absence of impulse and the laxity of the walls of the tumor, and also, possibly, its corrugated appearance, as it was probably tense and distended with fluid at some stage of intrauterine development, when the communication still existed. This opening having closed, the fluid had gradually disappeared, leaving the wrinkled and loosely hanging sac which was present at birth.

Case III.—Male infant, aged three months, with fluctuating tumor in lumbo-sacral region the size of an orange. This baby had no control over the sphincters and could not use its legs. Bilateral talipes varus was present. The skin was wanting over the upper half of the sac wall, which was exceedingly thin. Running across the middle of the sac was a pronounced groove or furrow, and flattened bands of the cord could be seen through the thin membrane adherent to its inner surface, rendering the diagnosis of meningomyelocele easy. The parents were willing to take even the slightest chance that offered any relief to the child, and as the infant was losing strength and in almost constant pain, I decided to operate, without very much hope of securing a satisfactory result. Under chloroform the skin was dissected free from the sac wall and the superfluous skin cut away. The sac was now opened laterally and the terminal filaments of the cord found spread out over its interior surface and intimately adhered to it. With considerable difficulty they were dissected loose and returned to the spinal canal. The redundant portion of the meninges was now cut away and the membrane sutured over the gap, taking care that the suture line should not be centrally

located, thus placing it on a different plane from those of the overlying structures. The gap in the spinal column was quite large in this instance, so the muscles lying on either side were loosened sufficiently to enable them to be drawn in over the defect, where they were firmly sutured with chromicized catgut. Owing to the fact that the cutaneous covering had been missing from the upper part of the tumor, it was necessary to undermine the skin on either side, by which means skin flaps were readily secured and the wound closed and sealed with iodoform-collodion. Prompt healing occurred, the baby sleeping naturally the night after operation for the first time since birth. In this operation, done some eighteen months ago, the results have far exceeded my expectations. Two weeks after operation full control over the sphincters was present and one month later the child was kicking its feet about lustily, something it had never done before. A letter recently received from the parents says that the baby can stand, but has not yet walked. They are to bring it in to have the club-feet corrected, after which I fully expect it to walk.

CASE IV.—Male infant, aged ten weeks, presenting a fluctuating tumor in the lumbo-sacral region in the median line. This tumor was the size of a large orange and the skin covering was entirely absent. In color it was blue-black and the sac wall seemed so thin that it would burst almost if touched. The slightest pressure caused the child to cry out, and if this pressure was continued a sort of convulsive shudder would ensue. The center of the sac wall was dimpled, and at this point a nerve could be seen attached to its surface. Marked anesthesia of both lower limbs was present together with talipes calcaneus. This child, like the

others, was really in a pitiable condition. It was weak and emaciated, could not sleep well and was exceedingly fretful, in fact had almost worn its mother out with the constant attention it required. Operation was advised and accepted. It was carried out exactly as in the preceding case, except that it was not necessary to dissect the nerves from the sac wall, as they were free in the cavity with the exception of one filament, which was attached to the membrane at almost its center. This was easily freed and returned with the rest into the canal. The remaining steps of the operation were similar to those of the last case, as the spinal defect here also was very large. Recovery was quite uneventful, and in a few days the child entirely lost its fretfulness and began to grow fat. In one month anesthesia of the legs had entirely disappeared. As the operation was done only eight months ago I do not know whether or not this child will walk, but suppose that he will as he apparently has full control of his limbs.

These cases have not been selected for the purpose of making a showing. They are the only cases of spina bifida upon which I have had a chance to operate. I realize that the results secured have been most fortunate and that they could not invariably be expected in this class of cases. Had I consulted my own inclination I should not have operated upon Case III at all. In fact, operation in that case had been advised against by two very competent men. The result indicates that we cannot be positive as to how much or how little such an operation may accomplish in every case. The recovery from paralytic symptoms in Case III and from anesthesia in Case IV would seem to indicate that those symptoms might have been due

to the pressure of the fluid, and that early removal of such pressure may afford almost, if not complete, relief in certain cases.

CONCLUSIONS.

1. Owing to the distressing nature of the affection the high mortality should not prevent attempts at surgical relief.

2. Meningoceles. meningomyeloceles, and syringomyeloceles may be considerably benefited by operation.

3. The improvement in function cannot with certainty be estimated before operation, and pronounced evidences of nervous disturbance are not a contraindication to excision.

4. Asepsis is absolutely essential, and though difficult to secure may be maintained by exercising extreme care.

5. The plan of having the suture lines of the meninges and the overlying tissues on different planes will in the majority of instances prevent leakage of cerebrospinal fluid.

6. The suggestion of Pearson to prevent the escape of this fluid during a prolonged operation by stuffing the canal with gauze is valuable.

7. Large bony defects may be effectually closed by muscle much easier than by osteoplastic methods.

8. It is not necessary to keep the child off its back during the healing of the wound as frequently advised.

9. Children with hydrocephalus accompanying spina bifida should not be subjected to operation.

DISCUSSION.

DR. JOHN P. LORD, of Omaha, Neb.: Mr. President—I wish to commend very highly and endorse fully the position taken by Dr. Knott. I can endorse what he has said from personal experience, which has been practically the same in a number of cases. My patients have all recovered that have been

operated on. I have seen several cases of the sessile variety which had already perforated, and for which apparently nothing could be done. I want to emphasize the great importance of the procedure recommended by the essayist in contradistinction to the older method by injection, which I regard as having no place in our present day surgery. The precautions which the doctor took in his technique in the handling of the cases were beyond criticism. The thought which occurred to me is this, and perhaps it would not be necessary to mention it had I made previous researches: The books state that this condition is likely to be associated with club-foot. The question arises whether this is a coincidence, or whether the club-foot is due to a paralytic condition on account of imperfect development, or whether possibly early malposition may have something to do with spina bifida and the consequence of it.

DR. LEONARD FREEMAN, of Denver, Colo.: There is no question about the propriety of operating on these cases early, as they stand operation well. In those cases in which the opening is small through the bony canal, it makes a difference what operation we do. But in those cases in which the opening is large, it is desirable to get a solid support, so that the hernia, so to speak, may not return. In very young infants an extensive osteoplastic operation is scarcely advisable, on account of the smallness and non-resistance of the infant.

In a case I operated on not long ago, a baby nine weeks old, it occurred to me to take advantage of a method which I have not seen mentioned anywhere, but which is very simple, and which answered the purpose in this case. After dissecting out the sac and cutting off a large portion of it, I simply took stiff silver wire (No. 27), with strongly curved needle, and whipped it over the opening in the cord, the meshes of wire being close together. This is better than the celluloid plate which is advocated.

It has been suggested by Marcy, of Boston, to operate with the head of the child downward, in the exaggerated Trendelenburg position, to prevent the loss of cerebrospinal fluid. In that case the cerebrospinal fluid could not run out. The only way it could get out would be by blood going into the vessels of the cerebrospinal system in order to take the place of the fluid, or by depressing the fontanelles. This could not express much fluid; but if you place the child with head downward, it would seem the blood would rush into the cerebrospinal system and force out the cerebrospinal fluid. Most of the fluid is not lost with this position of the child, on account of the struggling and crying during the course of the anesthetic.

DR. C. H. MAYO, of Rochester, Minn.: The paper presented, as well as the discussion, reports unusually successful surgery, the results being much better than are usual in this line. The shock of a few deaths led me to investigate their cause. First, we must consider cephaloceles, hydrocephalus, hydrencephalus, and spina bifida as all belonging to the same class of intrauterine malformation. Second, they are

hernias with or without other structures present than the cerebrospinal fluid. Third, that by the laws of hydrostatics, through the various foramina and valves the cerebrospinal fluid in the ventricles, spaces, meninges and tumors is at an equal and even pressure. Fourth, the bulk of the fluid is formed in the lateral ventricles of the brain, and the sac is not necessarily a secreting surface, and if it were, the pressure would not be local.

If we operate on an increasing spina bifida, the chances are that a pressure death will occur unless there is temporary leakage. While I in no way wish to decry the operation, there is much concerning these cases that we do not understand.

DR. A. E. HALSTEAD, of Chicago, Ill.: In connection with what Dr. Mayo has said, I wish to say that sometimes we have what is known as spina bifida occulta, that is, spina bifida without a tumor. In such cases the paralytic symptoms and trophic disturbance are more marked than in those cases where we have a tumor.

I have had a case within the last year of a baby that had spina bifida occulta. The child received an injury to the sacral region, followed by the development of a fistula. Intending to close the fistula, I found a dermoid, removed it and closed the fistula. The child progressed and did very well for four months, all of the symptoms seeming to disappear, when suddenly symptoms of transverse myelitis developed, with complete paraplegia, and soon after the child died. A post-mortem examination was not made, so that I cannot say what the real cause of the myelitis, or rather the paralysis, was.

I recall another case operated on a couple of years ago of spina bifida occulta associated with contractures and trophic disturbance of the feet. There was club-foot on both sides, with trophic changes in the tarsal bones which necessitated an amputation on one side. In all those cases there was no tumor. The nervous symptoms are much more marked than in any case in which tumor was present than I have ever seen. To bear out what Dr. Mayo has said, I will say that tumor is not an essential part of the disease. In many cases it is only an incident.

DR. KNOTT (closing the discussion): The etiology of this subject is considerably in dispute. I went into it in my paper as much as I could from the literature at my command, but I did not read the paper in full because it was too long.

The point made by Drs. Mayo and Halstead must be considered, but it is one that has been raised before and is not yet decided. If the tumor or swelling has nothing to do with the pressure induced by it, or has nothing to do with the paralytic condition which is benefited by the removal of the tumor, what was it which caused the paralytic symptoms to disappear? For what reason did this child improve?

As to these cases of spina bifida occulta, the only reason for the existence of the paralytic symptoms is that they are

supposed to be due to hypertrophy of the overlying tissue over this gap. You can get pressure there the same as you can get it from a visible tumor, with the resulting disturbances. I believe the element of pressure is a considerable factor which must be taken into consideration in these cases. I believe there are too many recoveries reported in cases where pressure has been relieved to warrant us in deciding that it has nothing to do with it, and that it is rather an effect than a cause.

As to hydrocephalus, it is a most definite contraindication for operation in cases of spina bifida. Every case complicated by hydrocephalus at the time of the operation, so far as I know, has resulted fatally.

THE OPERATIVE RELIEF OF IMPAIRED FUNCTION OF THE ELBOW-JOINT DUE TO FAULTY REATTACHMENT OF A SEPARATED INTERNAL HUMERAL EPICONDYLE.

By GILBERT GEOFFREY COTTAM, M. D.,
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Traumatic separation of the internal epicondyle of the humerus is usually considered by surgical writers to be a trifling injury. Without qualification, however, this opinion is apt to give rise to erroneous impressions, since in a certain proportion of the cases the epicondyle becomes reattached in a faulty position, with resultant limitation of joint-motion, aggravated by exuberant callus-formation and accompanied by pain and muscle atrophy due to pressure upon the ulnar nerve. These symptoms have often been ascribed to traumatic synovitis following the luxations with which epiphyseal separations at the elbow are so often associated, and it is only within recent years that a better understanding of the latter injuries has dispersed this incorrect deduction. We now know definitely that it is the rule rather than the exception for dislocations at the elbow, in young subjects, to be complicated by epiphyseal displacements, these complica-

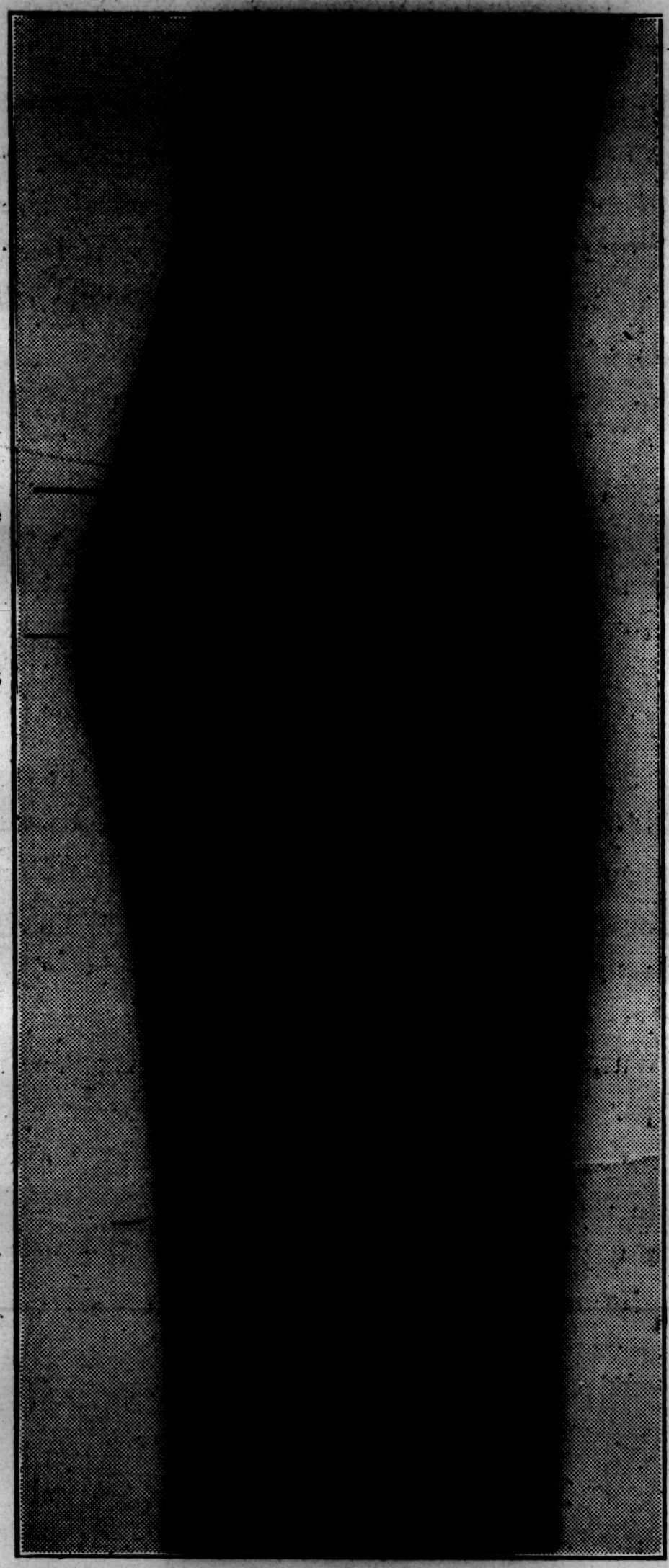
tions in turn being responsible for many of the bad results which are so common after the reduction of elbow dislocations.

The diagnosis having, in most instances, been improperly made out, the treatment has, perforce, been equally unsatisfactory. Very few examples of rational surgical intervention are on record, the vast majority of cases being treated by the let-alone method, while, according to Jonathan Hutchinson, Jr.,[1] some German operators, including Bardenheuer, have gone to the other extreme and practiced complete excision of the joint, a wholly unjustifiable and unnecessary procedure.

The operation of election in the future will, unquestionably, be that of simple excision of the epicondyle, since by this method the best possible results are obtained, with a minimum of interference with the parts. The one plausible argument against it, that it might weaken the power of flexion by destroying the point of origin of the principal flexors of the forearm, is proven untenable by actual experience, although Gibney, of New York, has apparently anticipated it by cutting down, in one case, upon the epicondyle, freeing it with a chisel from its abnormal attachment and securing it to its original site with kangaroo tendon, with a good result.[2] It is true, too, that it is difficult to remove the epicondyle from in front of the joint without opening the joint, yet I am sure that no one who does clean surgery, and these words are addressed to no others, will urge that as a valid objection.

With the hope of making a slight addition to our knowledge of this subject I present the following case-report, with accompanying skiagram:

Johnnie S., aged 11 years, was thrown down by


Original site of epicondyle
New site of epicondyle, front of elbow-joint.

some cattle, falling heavily upon his right elbow. A physician found an outward dislocation of the elbow accompanied with much swelling, reduced it under chloroform and applied a right-angled splint, which was permanently removed at the end of three weeks. The functional result at that time appeared good, there being only such slight stiffness as would ordinarily be expected. Four weeks later the boy returned, this time complaining of pain and limited motion. The case being referred to me, I found upon examination marked cubitus valgus, motion limited to 15° and painful at that, more so on attempting to increase the range of motion. The epicondylar flexors were decidedly atropic. Pronation and supination were unimpeded. At a distance of 2 cm. below and slightly anterior to the normal site of the internal epicondyle, I found a hard mass, which could be moved a very little under firm pressure. This I took to be the displaced epicondyle, which assumption was confirmed by a fluoroscopic examination made shortly afterward. The skiagram here shown indicates the condition of the parts as observed at that time.

On June 17, 1901, fifteen weeks after the receipt of the injury, I made a longitudinal incision down to the hard mass before referred to and found it imbedded in a deposit of fibrous adhesions. My first intention had been to release the epicondyle and anchor it back to its former position, after the plan of Gibney, but this proving impossible, I excised the epicondyle. Although all care was exercised to prevent doing so, the elbow-joint was opened, but closed again with a running catgut suture as soon as the mass was removed. After closing the skin incision, I put up the arm in a right-angled splint for twelve days, after which all

dressings were removed and active motion permitted. The outcome was very satisfactory. The full use of the arm has been recovered, enabling the boy to perform all kinds of heavy farm work without pain or difficulty. The flexors have regained their normal tone and growth and seemingly functionate as well as if they had a normal epicondylar attachment.

In conclusion, I can do no better than repeat the words of John Poland, whose monumental work has done so much to arouse interest in the subject of epiphyseal separations, in reference to the indications for the removal of this epiphysis: "When the displaced epiphysis appears to be the cause of the limitation of the movements of the elbow, or when there are symptoms of pressure upon the ulnar nerve—especially if it is believed that such is not due to recent callus and that the pressure symptoms are not likely to disappear—excision of this process should be carried out under strict antiseptic precautions on account of the probability of opening the joint."[3]

REFERENCES.

[1] British Medical Journal, January 16, 1892, p. 113.
[2] New England Medical Monthly. April, 1901, p. 142.
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THE MISLEADING SIGNIFICANCE OF OVARIAN PAIN.

By C. LESTER HALL, M. D.,
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I wish in the beginning to say that I recognize the existence of actual pathological conditions in the ovaries and tubes and pampiniform-plexus which demand surgical interference in order to obtain relief, and I believe I may claim a ready willingness to resort

to such measures in proper cases. With this disclaimer as to my position on the subject I feel that I am warranted in asking your consideration of some conclusions forced upon me by a rather long experience. When we consider the wonderful change in the practice of gynecologists within the last decade, preceding which oophorectomy was the fate of every painful ovary by aspiring surgeons, I feel that I am justified in claiming that pain in the ovary does not necessarily depend upon pathological changes, and that the rational conclusion in considering so sensitive an organ as the ovary is that the pain experienced is often reflex and sympathetic.

We talk a great deal and teach our classes of the importance of recognizing uterine reflexes in their various manifestations, and yet I am convinced that we often fail to recognize in ovarian pain a genuine uterine reflex. Pain in the pelvic and abdominal cavities from defective elimination by kidneys and bowels and auto-infection produced thereby is recognized by every careful observer. I am satisfied that we, as gynecologists, do not sufficiently consider the symptomatology in diseases of women. Such is our haste, quickened by preconceived opinions, as to the conditions causing trouble with women that we arrive at precipitate conclusions. When we consider the close anatomic relations between the ovaries and uterus it seems strange to me that we have not recognized the close sympathetic conditions that must exist, and not consign every painful and even tender ovary to total ablation. We know that infection, as a rule, progresses from the endometrium to the tubes and ovaries, and experience has taught us that where this pathological condition exists, and where one ovary with the tube is removed, that sooner or later the

other tube and ovary become involved. These are actual conditions seen by us all, but we fail to take cognizance of the possibility of a reflex or sympathetic pain in the ovaries with an inflamed endometrium and a stenosed cervix.

It often happens that women consult me for what they consider ovarian diseases, and with bimanual examination and palpation I find the ovary tender, as, indeed, even every healthy ovary is when brought between counterpoising pressure, but further investigation shows that the real tenderness and pain is experienced when the uterus is palpated and elevated in the pelvic cavity, satisfying me that the source of the trouble is not in the ovary but in a parametritis associated with endometritis. In these cases, whilst palliation of the distress measurably follows the hot douche and the hygroscopic tampon, the real and marked relief follows dilatation of the cervix and the application of antiseptics to the endometrium. When treated in this way my patients soon cease to complain of their ovaries and recognize the uterus and its immediate surroundings as the fons et origo of all their trouble. With the subsidence of the uterine catarrh and the general improvement that follows the treatment my patients improve in appearance and strength. Their faces no longer present the troubled and careworn expression, and the general appearance of relief is so manifest as to be recognized by the laity; furthermore, these women, often sterile, have become proud and happy mothers. In many cases where I can obtain the consent of the patient, or her time for treatment is limited, I have resorted to curettage with the gratifying result of giving entire relief.

CASES.

Mrs. S. had a miscarriage April 7, 1895. With blunt curette the uterus was thoroughly cleaned out and the patient soon apparently recovered. Since that time, however, she has had frequent attacks of pelvic pain, especially within the ovary. So marked was this pain in the ovary that at one time I felt sure it would have to be removed. A few dilatations of the cervix and applications to the endometrium have from time to time relieved her of all symptoms, and whilst she has never borne children she is today a healthy woman.

Mrs. R., who had suffered for years with pelvic pain referable to the ovary, consulted me in January, 1890, for severe pain in the right ovary. So intense was this pain that I felt apprehensive that a real pathological condition existed, and told her that she would in all probability have to undergo a surgical operation. Her pain was often intense but associated with little or no fever, but with nervous chills, headache, etc. She was nulliparous. Notwithstanding this severe pain in the ovary, digital examination revealed the fact that the principal point of tenderness was in the uterus and its immediate surroundings. The same method of treatment, dilatation with antiseptic applications to the endometrium, in a short time relieved her. In July, 1901, this same patient consulted me for a similar condition with even more aggravated and marked symptoms of pain in the ovary, with loss of flesh and general depreciation of the vital forces. The same plan of treatment relieved entirely the pain in the ovary, and whilst there still exists some evidence of parametritis she no longer has pain in her ovary, and declares that she is quite well.

Mrs. R. W. S., from Ratom, New Mexico, was brought to my office by her husband in July, 1899, for examination. I found that she had suffered for a long time with pelvic pains and, as she described it, "pain and tenderness in the ovary." She was very much run down in health and presented a delicate appearance, as she really was a very delicate woman. After completing my examination I was asked if it was necessary for her ovaries to be removed. I told her no, I thought not, that the pain she had in her ovary was a sympathetic manifestation of disease of the womb; that I thought she might be relieved by local treatment. Whereupon her husband said, "Why, Dr. —— examined my wife today and said nothing but the removal of the ovaries would give her any relief." I protested that as his wife was a patient of Dr. ——, who was my personal friend, and in whose ability I had confidence, that he should not have brought his wife to me for examination. He said he had paid the doctor and proposed to pay me and then decide what he would do. I advised and insisted upon his taking his wife back to my friend, which he declined to do, saying, "You have already said that you believe she could be cured without operation, and as I am not committed to Dr. —— I shall insist on your treating her." As there was nothing left for me to do I consented and did treat this woman, with the result of rapidly relieving her of her symptoms, and in a short time she returned to her home in New Mexico, and in about a year sent me a photograph of her baby in her arms. Now, it may be argued, and perhaps justly so, that because this woman bore a child is no evidence that one ovary or both were not diseased. Granting the justification of such a position, it must be acknowledged that this woman,

who desired maternity above all else, could not have become a mother had my friend removed her ovaries.

These are only a few of very many cases I could relate, but the time of this Association is too valuable to weary you with their recital. Suffice it to say that along with the trend towards conservatism in the treatment of women the position that I take in reference to ovarian pain is, in my humble opinion, entitled to careful and serious consideration. To him who is an operating gynecologist only, I am aware that my position seems ridiculous, and perhaps to a large majority of the members of this Association my practice will be denominated tinkering, but actuated as I am by a desire to arrive at sound logical conclusions, and to do the greatest good to the greatest number with the least possible harm, and to preserve to woman her sexuality, I am emboldened at the risk of incurring criticism to present this paper.

PERSONAL EXPERIENCE WITH CONTUSED. GUNSHOT, AND STAB WOUNDS OF THE ABDOMEN.

By J. E. SUMMERS, JR., M. D.,
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The frightful mortality of traumatic intra-abdominal lesions is well recognized, but a contributing cause of the mortality, in importance the most potent next to the injury itself, is the hesitancy upon the part of physicians and surgeons to act promptly in cases of this character. Too much valuable time is spent in analyzing symptoms in order to determine in a given case whether or no an intra-abdominal injury has followed a trauma. While the refinements of the analysis of symptoms is progressing, in case a hollow viscus

has been ruptured or perforated, the almost inevitable death watch is established. A recent article by Stewart (American Journal Medical Sciences, Nov., 1901) giving a resume of sixty-five different articles regarding the treatment of possible or probable ruptures of the bowels following trauma to the abdominal walls, leads one to the conclusion that we are far from appreciating the life-saving position necessary to save the greatest number of people. In order to more fully comprehend the difficulties of a positive diagnosis relative to whether or no intra-abdominal lesions of the hollow viscera have followed a contusion of the abdominal wall, I desire to call particular attention to a paper by Bottomley (Boston City Hospital Reports, Twelfth Series) just published. This paper is based upon a comparison of twenty cases of abdominal contusion which produced intestinal injury, proven by post-mortem or operation, and twenty cases of abdominal contusion which recovered unaided by surgery. Bottomley says:

"Consideration of the combinations of symptoms leaves us in just as much doubt regarding the diagnosis as that of the individual symptoms. In the twenty cases of intestinal perforation there are eleven different combinations of symptoms. Pain, tenderness, muscular spasm, and vomiting were found associated four times; pain, tenderness, and external signs of injury, three times; these are the combinations found associated in the greatest number of cases; they are certainly not incompatible with a very simple injury, and are of no importance from a diagnostic standpoint.

"*Results and Conclusions.*—Of the twenty cases of injury to the intestine, nineteen died and one recov-

ered. Eleven of the cases underwent operation; nine were treated expectantly; of the latter all died; of the former one recovered. Of the operated cases, one was submitted to operation less than four hours after entrance to the hospital and recovery followed; four were operated on five or six hours after, one twelve hours, four twenty-four hours, and one forty-eight hours after; all these died.

"As far as statistics go, they tend only to strengthen our position. Nimier (Arch. Med. et Phar. Mil., Mar., 1898) mentions 307 cases of abdominal contusion caused by horse kicks. All were treated expectantly, 215 recovered and 92 died. The 215 cases that recovered offer no particular lesson to us. Our interest lies in the ninety-two that died. How many of them would have been saved by an early exploratory incision and the knowledge thus obtained?

"Schmitt (Munch. med. Woch., July 19, 1898) finds that a mortality of 97.5 per cent. has followed the expectant treatment of abdominal contusion with symptoms sufficiently severe to suggest possible perforation of the intestine. On the other hand, Petry (quoted in Prog. Med., June, 1901) presents a table of forty-two similar cases, operated on between 1883 and 1896, which show a mortality of 66.7 per cent., while Kerstein's (Ibid.) eighteen cases operated on between 1897 and 1899 resulted in a mortality of 55.5 per cent. In four of his cases laparotomy was done within five hours after the receipt of the injury; all these recovered, and his statistics bear out the fact that every hour that goes by after the receipt of the injury lessens the prospect of cure by operation. The reported mortality of cases operated on in the first twenty-four hours is 45 per cent.; after the first twenty-four hours, 66.6

per cent. These figures, compared with the 97.5 per cent. mortality of the expectant plan, speak for themselves, and make a strong plea for very early interference."

I have quoted the views of Bottomley, based upon a review of actual experiences in one of our best hospitals, because I am convinced of their soundness. True it is that many things must be considered in each individual case; in one, no doubt would seem to enter into the certainty of an intra-abdominal lesion; in another, serious misgivings as to the justifiability of surgical intervention would be recognized; so it is always wise to well weigh the history of the case and each objective and subjective symptom. The condition of the bowel, whether full or empty; the direction of the blow and the part of the abdomen struck; whether or no the abdominal muscles were "on guard"—all of these points are fully recognized in the mechanics of abdominal injuries. We should always remember, however, that apparently trivial injuries, judged by the symptoms produced, may soon be followed by the most fatal consequences, because of sloughing following contusion of the bowel wall or as the result of injury to the mesenteric vessels. Referring again to the paper of Stewart, I wish to emphasize what I consider one, if not the most important symptom of injury, and that is rigidity. Hartmann reported ten cases where this sign was marked. Nine were successfully operated upon and distinct lesions found. The remaining case refused operation and died as the result of intestinal perforation. Of seventeen cases without rigidity all recovered without operation. Of Makins' twenty-one cases from the records of St. Thomas' Hospital two were without abdominal tenderness. Of

this series six were profoundly and eight lightly shocked—here again we see the unreliability of symptoms. Henry Makins (Annals of Surgery, Aug., 1899) says:

"Of 299 abdominal injuries treated in St. Thomas' Hospital during the preceding ten years, eighty-nine were ruptures either of the abdominal viscera, or the urinary bladder, thus 30.47 per cent. Further, that of these eighty-nine cases, twenty-one, or 23.59 per cent., were ruptures of the intestine. The order of frequency of the visceral ruptures comes out as follows: Kidney, 39.32 per cent.; intestine, 23.59 per cent.; liver, 16.89 per cent.; spleen, 11.23 per cent.; bladder, 5.61 per cent.; mesentery, 3.27 per cent. The relative frequency of injury to the kidney, it need hardly be pointed out, is probably due to the fact that the organ may suffer whichever flank is injured."

Further on in his paper Makins says:

"As to prognosis in general, considering that up to ten years ago this injury was regarded as a mortal one, the results obtained in the twenty acutely coursing cases must be regarded as highly satisfactory. Of the whole number, seventeen died and three recovered, or 15 per cent. Of the whole twenty, however, only fifteen were operated upon, with the same number of successes, or 20 per cent. Sixteen of the twenty ruptures implicated the small intestine; of these two, or 12 per cent., recovered. The remaining four were of the large bowel, and of these one, or 25 per cent., recovered."

My own experience in contused wounds of the abdomen in which the diagnosis was corroborated by operation, post-mortem or positive clinical signs, other than the symptoms common to *all* severe abdominal con-

tusions, is twelve cases. (This does not include, of course, many cases seen casually, in which my responsibility was limited.)

CONTUSED WOUNDS.

Falls and run-over accidents.	Rupture of kidney, 7; operations, 4; died, 1 (not operated). Rupture of liver, 1.
Flying objects and kicks of horses.	Rupture of bladder, 1; operations, 1; died, 1. Rupture of intestines, 3; operations, 1; died, 3.

Of the seven ruptures of the kidney six recovered and one died; this latter not operated. One nephrectomy (extraperitoneal) was done. In two cases the kidney was drained by a retroperitoneal incision. In one of these cases an exploratory abdominal section preceded the posterior incision, the symptoms having pointed towards a peritoneal infection. In one case unquestionably both kidneys were ruptured, a wheel of a heavy patrol wagon having passed across the upper part of the abdomen. Two weeks later urine and blood were removed from a fluctuating tumor appearing in the back on a level with the kidney area.

Rupture of the kidney is a very common accident and is usually recognized by shock, localized pain, and the passage of bloody urine. A localized tumor will not form if the rupture occurs directly through the peritoneal investment into the peritoneal cavity. If the rupture occurs so that the blood accumulates in the loose cellular tissue surrounding the kidney, a tumor forms rapidly, presenting first in the posterior ileocostal space, enlarging downwards, forwards and inwards. Urine may also extravasate in the same directions and even towards the surface.

When a kidney is so lacerated that the hemorrhage accumulates in its pelvis, the tumor is usually small and forms slowly, perhaps requiring several days before it can be detected. In such cases either the amount of blood in the urine is rather excessive or because of a blocking of the ureter by clots little or no blood is found in the urine. When the ureter is blocked or injured so as to prevent the escape of bloody urine into the bladder, the tumor may enlarge quite rapidly, being similar in its action to an acute hydronephrosis.

The writer has found the Harris instrument and Kelly cystoscope and ureteral catheters of great value in determining the source of a hematuria, as well as the functional integrity of both kidneys.

The other cases were of no especial interest, except the fatal one; in this, upon post-mortem examination, the right kidney was found torn from its moorings, anchored only by its ureter.

The single case of rupture of the bladder was rather unique. A man 65 years of age had been kicked in the lower abdomen by a horse five days prior to entrance into the hospital. The clinical signs of intraperitoneal rupture of the bladder were positive, likewise the evidence that five and one-half days urinary secretion had accumulated in the peritoneal cavity. The pulse was 95. Temperature (rectal) 99.4° F. Upon opening the bladder more than one gallon of urine and a few pale blood-clots were removed—there was no peritonitis. The injury to the bladder, which was both extra- and intraperitoneal, was repaired, and the bladder drained. The man's condition after operation was excellent, and the kidneys continued to functionate. Nevertheless, convulsions developed without elevation of temperature and the man died comatose in twenty-four hours.

Reginald Harrison narrates a similar ending of a case *not operated* upon, and queries, "Could the death of the man be attributed to peritoneal absorption?" I am absolutely certain that in my case such was the cause of death.

Rupture of the Intestine.—One case of rupture of the intestine was in such good condition three days after the accident, both as to pulse and temperature, with rather indefinite abdominal symptoms, that I advised against interference. Two days later, on opening the abdomen, a large amount of pus escaped, the man dying in a few hours. The second case was evidently septic from peritonitis, and I refused to interfere; he had been kicked by a horse twenty-four hours before being sent to the hospital. Post-mortem: the small bowel had been completely rent across, and there was a big tear in the omentum. In the third case early operation was offered, but refused. Post-mortem: a tear which had been incomplete in the beginning, evidenced by the condition of the bowel and the surrounding protective adhesions, later caused fatal infection. As I have tried to indicate, there are no *early* positively identifying symptoms of rupture of the bowel due to abdominal contusions, unless they be shock, *together with* pain; a retracted abdominal wall, pain on pressure being most marked over area of greatest muscular rigidity; vomiting. Given these symptoms, we have enough; and if others are added to corroborate the diagnosis, more than enough to demand immediate operation. If we delay for symptoms of peritonitis to appear, we may just as well wait for the post-mortem operation to discover the origin of the infection.

Gunshot Wounds of the Abdomen.—Since the fighting in the war between Turkey and Greece, our own

war with Spain, and the continued fighting in South Africa and the Philippines, a kind of reaction has taken place regarding the established dictum, viz., "Early operation in every case of penetrating gunshot wound of the abdomen." The reaction or backward step being the result of reports from the field and base hospitals going to show that only from 70 per cent. to 80 per cent. of all penetrating military gunshot wounds of the abdomen died under expectant treatment, and all available statistics in civil practice regarding the results of abdominal section in such cases gave a mortality very little, if any, lower. Many, if not most, of the cases treated expectantly and successfully were, without doubt, instances where balls traversed the abdominal cavity without wounding hollow viscera, and indeed E. F. Robinson, who was operating surgeon in the Manila First Reserve Hospital, says (Annals of Surgery, Feb., 1901): "The liver, kidney, and bladder were repeatedly punctured, and the cases recovered as if from a simple wound, with the least possible inconvenience. Death from hemorrhage usually followed wounds of the spleen. Our record contains but one bullet wound of this organ that recovered." Robinson also makes the statement: "In our records there are forty-five cases of penetrating gunshot wounds of the abdomen. Eight of these were brought in dead or died within twenty-four hours, before any operative interference was possible. Of the thirty-seven remaining, thirty-four were from the Mauser or Krag. Of these, thirty were treated without operation, ten recovered, a percentage of 66.2-3 per cent. recovery. These wounds were received at all ranges and in all parts of the abdomen."

Again, Makins, "Surgical Experiences in South Africa," says:

"*Prognosis in Intestinal Injuries.*—This was of a most discouraging character compared with the prognosis in abdominal injuries as a whole. The cases were of two classes, however; those that died within twenty-four hours and those that died at the end of from three days to a week. Cases falling into the first category are obviously of little importance from the point of view of surgical treatment. Many of them died from the widespread nature of the injury and the shock produced by it; others from hemorrhage from the large abdominal vessels. It is unlikely that any could have been saved, even under the most satisfactory conditions. In the following small table, therefore, I have included only the cases which have been already quoted, which survived long enough to be amenable to surgical treatment, and which were for some days under my own observation. Some of them, in fact almost all, I watched until they were either convalescent, or died, and in six I performed operations.

"I am aware, and have short details of the histories of eight patients wounded in the same battles who died prior to the termination of the first thirty-six hours; but these are not included, for the reason stated above and also because I am uncertain whether all the injuries were produced by bullets of small calibre.

Viscus wounded.	No. of cases.	Localized secondary suppuration occurred.	Recovered	Died.
Stomach certain	2	.....	1	1
Stomach possible	1	.....	1	.....
Small intestine certain	5	0	.....	5
Small intestine possible	10	0	10	.....
Large intestine certain	8	4*	4	4
Large intestine possible	4	.....	4	.....
Bladder certain	3	3	1	2
Bladder possible	1	.....	1	.....
Liver	6	.....	6	.....
Kidneys	6	.....	4	2
Spleen	3	.....	2	1
Total	49†	.....	34	15

*Two of these died.

†The cases of injury to the solid viscera are only those which happen to be quoted in the text, and give no idea of relative mortality.

"Included in the above table are thirty instances of intestinal injury, and these are divided up according to the segment of the intestinal canal implicated, and also as to whether the perforation was certain, or only assumed from the position of the external apertures and the presence of abdominal symptoms of a noticeable grade. From this analysis it appears clear—

"1. That wounds of the stomach have a comparatively good prognosis, and that they may recover spontaneously. It is true that only two examples are included in my table; but I was at various times shown patients with similar injuries and histories and a number of cases which have been published appear to substantiate the opinion. From our experience of the occasional spontaneous recovery of gastric perforations from disease, I think we might be prepared to expect that the stomach would offer a comparatively favorable seat for these wounds. It may be pointed out, however, that hematemesis, the main feature in the

symptoms pointing to wound, is by no means direct proof of more than contusion.

"2. That perforating wounds of the small intestine are very fatal injuries; every patient in whom the condition was certainly diagnosed died.

"3. That in the cases in which a perforation was inferred from the position of the external apertures and the symptoms, not one patient suffered from the secondary complications—e. g., local peritonitis and suppuration, which were common in the case of the large intestine, and which we are accustomed to see after perforation from disease. This renders the occurence of actual perforation in the majority of the cases a matter of grave doubt. If spontaneous recovery does take place after this injury, it is only in cases in which the wounds are single, and slight in character.

"4. That in eight cases in which perforation of the large intestine was certain, four recoveries took place; but in each instance suppuration occurred. I am, however, quite prepared to believe that perforation may have occurred in some or all of the other four cases included as 'possible' provided the wounds were intraperitoneal.

"Wounds of the cecum and ascending colon are those which have the best prognosis, and after those of the rectum. The comparatively good prognosis in these parts is what would be expected, on account of their greater fixity, and lesser tendency to be covered by the small intestine. An extraperitoneal wound of any of these portions of the bowel is more dangerous than an intraperitoneal and more likely to give rise to septicemia."

The Surgeon General's U. S. Army Report for 1899 states that of sixty penetrating gunshot wounds of the

abdomen nineteen recovered, and of these only one out of five operated recovered, being largely in favor of the expectant treatment. If the penetrating wounds of the abdomen reported in 1898 be added to those just mentioned, the fatal cases are found to constitute 70 per cent. of the aggregate. The Surgeon General's Report for 1900 says that of the gunshot wounds for 1900, fifty-seven were killed, also twenty-eight deaths occurred among thirty-five penetrating wounds of the abdomen, a mortality of 80 per cent. as compared with 70 per cent in the years 1898 and 1899. Laparotomy was performed in four of the twenty-eight cases, and an abrasion of the ileum was sutured in one of the seven cases which recovered. This again emphasizes the advantages of expectant treatment. These military statistics are all right when properly interpreted, but if given as an index to civil practice are very dangerous.

Robinson in his article admits that many of his cases were wounds of other abdominal organs than the bowel, and that all such cases were treated expectantly. Of course such recoveries help materially to swell the percentage of recoveries by expectant treatment. Again he says that eight of his cases died before admission into the hospital, or within twenty-four hours, and leaves these cases out of his statistics, while he reports one man operated successfully who was admitted within one hour after injury, in whom he ligatured vessels in the course of the bullet through the mesentery and omentum, removed a large amount of clots and free blood, and in all probability saved what would have been recorded as a fatal case of gunshot wound of the abdomen from intestinal perforation.

Unquestionably many of the cases designated in the

Surgeon General's Report as "killed" and from South Africa "died prior to the termination of the first thirty-six hours" were of this type and in civil practice would receive prompt surgical aid and appear in statistical reports as recoveries or deaths following operation. The vessels of the omentum, mesentery, and branches of the main abdominal vessels are frequently wounded with or without wounds of the viscera. Unless the hemorrhage is controlled by surgical assistance, death may follow within a few hours. Watson Cheyne, Makins, and others graphically describe such instances. Those who are particularly interested in this matter will find the best writings on modern military surgery from the standpoint of the hospital civil surgeon in the recent books by Henry Makins, "Surgical Experiences in South Africa"; "A Civilian War Hospital," by Anthony A. Bowlby, and others. Besides the writings of the civilian consultants, Watson Cheyne, Treves, and the late Sir William MacCormac furnish rich food for thought.

The most reliable civil statistics of penetrating wounds of the abdomen of which I have knowledge are those from the Charity Hospital, New Orleans. They are of a goodly number, were treated under the same surroundings and by gentlemen of like surgical ability, and that of the best. (E. D. Fenner, Annals of Surgery, Jan., 1902.) The records of the Charity Hospital show that from January, 1892 to January, 1901, laparotomy was performed for penetrating wounds of the abdomen one hundred and fifty-two times, with eighty-seven deaths, a mortality for all cases of 57.23 per cent. One hundred-five cases of gunshot and stab wounds of the abdomen operated upon, with visceral injuries, of which seventy-four died, a total mortality of 70.47 per

cent. Of these 105 cases with injuries of the viscera, ninety-six were gunshot wounds, of which seventy-one died,—a mortality of 73.95 per cent.; and nine were stab wounds, of which three died,—a mortality of 33.33 per cent.

Fenner says: "In spite of the high mortality shown by these tables I do not think they should discourage the operation. A mortality of 73.95 per cent. in gunshot wounds *with injury of the hollow viscera* means in my opinion, that 26 per cent. of these patients had their lives saved by operation; and a death-rate of 33.33 per cent. in stab wounds, with the bowels cut, means that two-thirds were saved from certain death."

My personal experience with gunshot wounds of the abdomen is contained in the following table:

Stomach, large and small intestines, 1; operations, 1; died, 1.

Sigmoid flexure, 1; operations, 1; died, 1.

Small intestines, 2; operations, 2; died, 2. (Operations done by colleagues with my advice and assistance.)

Peritoneum, intestines escaping, 1; operations, 1.

Lung, diaphragm, liver, and spleen, 1; operations, 1.

Kidney, 1; operations, 1.

Liver and kidney, 2; operations, 2; died, 2.

Liver, 1; operations, 1; died, 1.

Shotgun Wounds: Large and small intestine, 1; operations, 0; died, 1. Kidney, 1.

Knife Wounds: Colon and mesentery, 1; operations, 1.

Of gunshot wounds of the intestines operated, four in number died. The case complicated by a wound of the stomach was so exhausted from hemorrhage when she arrived at the hospital two hours after the shoot-

ing that death followed shortly after operation. The same cause of early death can be attributed to one of the cases of wounds of the small bowel (operated on in a private house). In the other wounds of the small bowel the patient succumbed to peritonitis in spite of early operation.

Infective peritonitis had developed in the sigmoid injury; operation being done twelve hours after the shooting, but as soon as circumstances admitted—the fair character of the pulse seemed to justify interference.

In the case of the wound of the peritoneum the bullet had plowed a furrow in the peritoneum about two and one-half inches in length, the bowel escaping. Shock, pain, and muscular rigidity indicated perforation, hence the abdominal section.

The wound of the liver, right lobe (away from the border) and the two similar wounds complicated by wounds of the right kidney were operated with the object of tamponing the liver injuries and also by additional posterior incisions establishing drainage from the kidneys. Although there had been copious hemorrhage, it was found in each instance to be quiescent when the abdomen was opened. The removal of the accumulated blood and attempted tamponade started a renewal of the hemorrhage, which progressed until death. In the case of shot wound of the lung, diaphragm, liver, and spleen, the wound through the left lobe of the liver was sutured and the wound through the middle portion of the spleen was tamponed successfully.

The stab wounds of the colon and mesentery were repaired within one hour after reception, and although leakage had taken place, careful sponging without irrigation prevented infection.

The bullet wound of the kidney may have been only contusion causing hematuria, shock, etc. Incision through the muscles indicated without doubt that the bullet passed near to if not through the kidney, and it was extracted from just under the skin at a point on the opposite side of the body, having passed between two sinous processes.

The two shotgun wounds were at close range, relatively about ten and fifteen yards; the fatal one had for its center a point just above the umbilicus; in the other case the shot were scattered from the lower ribs to the buttock.

A gunshot wound of the abdomen should be operated if there is reasonable suspicion of penetration. In absence of the few positive symptoms of the wounding of a hollow viscus, operate just as quickly as possible as this is the one practical method of clearing up existing doubt, and giving the patient the best chance for recovery.

Gunshot wounds of the liver can be more safely treated expectantly than by operation. Wounds of the kidney require a post-peritoneal incision for drainage and possibly tamponade. Excessive bleeding may require nephrectomy. Gunshot wounds of the spleen are very fatal from hemorrhage and require immediate interference. All of my cases of gunshot wounds were made by 32 to 45 calibre bullets, most of them being 38 calibre.

The cases of abdominal injury were in adults, except one, a girl 8 years of age whose kidney was ruptured. It was tamponed and drained. These twenty-five patients, excepting five, were treated in Omaha. One of them was operated in Avoca, Ia.; one in Atlantic, Ia.; one in Woodburn, Ia.; one in Tekamah, Neb.; and one in Wyoming.

The necessities of military service prohibit active surgical interference in very many instances, when in civil life such interference promptly employed would be life saving. Again the modern military bullet is less dangerous than those of larger calibre fired with a much lower velocity. The area of necrosis along the bullet's track is relatively less and the wound or wounds are smaller. This being so in gunshot wounds of the abdomen, the danger of primary and secondary leakage with consequent infection is reduced.

CONSTITUTION.

NAME AND OBJECT.

I. The name of the Association shall be the Western Surgical and Gynecological Association.

II. Its object shall be the promotion and diffusion of knowledge in whatever pertains to Surgery and Gynecology, in the broadest sense of the terms.

MEMBERS.

III. The members of the Association shall consist of active members and honorary members.

The active members shall consist of such members of the regular profession who reside in the Western States and Territories, who are practicing Surgery or Gynecology as specialists, or who are limiting their practice largely to these branches, or are desirous of doing so.

Applications for membership must be endorsed by two active members and be submitted to the Executive Council, and on recommendation of the Executive Council shall be balloted for at the annual meeting.

A two-thirds vote in the affirmative of all the members present shall be necessary to elect; ten members, at least, being in attendance.

The honorary members shall consist of such distinguished specialists in Surgery or Gynecology who do not reside in the jurisdiction of the Association as hereinafter provided.

It shall be the privilege of each active member to recommend one honorary member, who shall be elected in the same manner as active members. They shall en-

joy all the privileges of active members, excepting the right to vote or to hold office, and shall not be required to pay any fee.

OFFICERS.

IV. The officers of this Association shall be a President, a first and second Vice-President, a Secretary-Treasurer, and five Executive Councillors.

The nomination of all officers shall be made by the Executive Council and submitted to the Association for final action and election.

The officers shall enter upon their duties immediately before the adjournment of the meeting at which they were elected, and shall hold office for one year.

The retiring President shall be a member *ex officio* of the Executive Council, and its chairman for one year, and shall remain a member for three years. All the other members of the Executive Council shall be elected annually in the same manner as are other officers.

Any vacancy occurring during the interim may be filled temporarily by the Executive Council.

ANNUAL MEETINGS.

V. The time and place of holding the annual meeting shall be determined by the Association each time before adjournment, or in case of failure, the Executive Councillors shall fix time and place.

It shall continue two days unless otherwise ordered by vote of the Association.

AMENDMENTS.

VI. This constitution may be amended by a two-thirds vote of all the members present at the annual meeting; provided that notice of the proposed amendment has been presented in writing at the annual meeting next preceding, or shall have been printed in the notification of the meeting at which the vote is to be taken.

BY-LAWS.

THE PRESIDING OFFICER.

1. The President, or in his absence the first Vice-President, and in his absence the second Vice-President, shall preside at all meetings, and shall perform such other duties as ordinarily pertain to the chair.

The presiding officer shall be *ex-officio* Chairman of the Executive Council, but shall vote therein only in case of a tie.

SECRETARY-TREASURER.

II. The Secretary-Treasurer shall attend and keep a record of all the meetings of the Association and of the Council, of which latter he shall be *ex-officio* Clerk, and shall be entitled to vote therein.

He shall collect all moneys due from the members, and shall pay all bills and render an account thereof at the annual meetings, when an Auditing Committee shall be appointed to examine his accounts and records.

He shall supervise and conduct all correspondence of the Association; he shall superintend the publication of the transactions under the direction of the Executive Council, and shall perform all the ordinary duties of his office.

He shall be the custodian of the seal, books, and records of the Association.

EXECUTIVE COUNCIL.

III. The Executive Council shall have the management of the affairs of the Association, subject to the action of the members at its annual meetings.

The President, or any three members of the Executive Council may call a meeting, and a majority shall constitute a quorum.

It shall have the control of the publications of this Association, with full power to accept or reject papers or discussions.

It shall constitute a court of inquiry for the investigation of all charges against members for offenses involving honor or law, and shall have the sole power of moving the expulsion of any member.

PAPERS.

IV. The titles of all papers to be read at any annual meeting shall be furnished to the Secretary not later than one month before the first day of the meeting.

No title of a paper shall be placed on the program unless the author be a member in good standing of this Association or shall have made application for membership and paid the admission fee.

No paper shall be read before the Association that has already been published, or that has been read before any other meeting.

Not more than twenty minutes shall be occupied in reading any paper before the Association, without the unanimous consent of the members present.

All papers read before the Association shall become its sole property if accepted for publication; and the Executive Council may decline to publish any paper not handed to the Secretary complete before the final adjournment of the annual meeting.

QUORUM.

V. The members present shall constitute a quorum for all business, excepting the admission of new members or acting upon amendments to the Constitution, when not less than ten members must be present.

DECORUM.

VI. No remarks reflecting on the personal or professional character of any member shall be in order

at any meeting, except when introduced by the Executive Council.

FINANCE.

VII. Each member on initiation shall pay a fee of $10, which shall include his dues for the first year.

Every member shall pay in advance the sum of $5 annually thereafter.

Any member neglecting to pay his annual dues for two years shall forfeit his membership.

No member shall receive the current volume of transactions unless his dues for that year have been paid.

The Secretary-Treasurer shall receive annually, for the services he shall have rendered the Association, such sum as may be fixed at the annual meeting.

ATTENDANCE.

VIII. Any member who shall neither attend nor present a paper for two consecutive years may, unless he offers a satisfactory excuse, be dropped from membership, upon vote of the Executive Council.

RULES.

IX. "Roberts' Rules of Order" shall be accepted as a parliamentary guide in the deliberations of the Association.

ORDER OF BUSINESS.

X. General meeting at 10 o'clock A. M.

a. Reports of Committee on Scientific Questions.

b. Reading of papers and discussions of the same.

The business meeting shall be held at 8 o'clock P. M. on the first day of the session (unless otherwise ordered by vote), at which only the members of the Association shall be present. The Secretary-Treasurer's records shall then be read and his accounts submitted; the report of the committee on other than scientific subjects offered; and all miscellaneous business transacted.

AMENDMENTS.

XI. These by-laws may be amended by a two-thirds vote of all the members present at any meeting; provided previous notice in writing has been given at the annual meeting next preceding, or shall have been printed in the notification of the meeting at which the vote is to be taken.

MEMBERS OF THE WESTERN SURGICAL AND GYNECOLOGICAL ASSOCIATION.

JANUARY, 1902.

Abbott, A. W., Minneapolis, Minn.
Allison, C. C., Omaha, Neb.
Anderson, Winslow, 605 Sutter St., San Francisco, Cal.
Andre, T. J., Schaller, Ia.
Andrews, E. Wyllys, Chicago, Ill.
Andrews, J. W., Mankato, Minn.
Anthony, Frank, Sterling, Ill.

Baker, L. J., Ottumwa, Ia.
Barton, G. C., Minneapolis, Minn.
Basham, D. W., Neal, Kan.
Beede, S. C., David City, Neb.
Benjamin, A. E., Minneapolis, Minn.
Bernays, A. C., St. Louis, Mo.
Brockman, D. C., Ottumwa, Ia.
Brown, Ewing, Omaha, Neb.
Byford, Henry T., Chicago, Ill.
Byrnes, W. J., Minneapolis, Minn.

Campbell, O. B., Chicago, Ill.
Carter, Chas. C., Rock Island, Ill.
Clark, E. W., Grinnell, Ia.
Cochems, F. N., Salida, Colo.
Cokenower, J. W., Des Moines, Ia.
Cole, C. K., Helena, Mont.
Cole, Jas. H., Thurman, Ia.
Condit, W. H., Minneapolis, Minn.
Connell, F. Gregory, Leadville, Colo.
Cottam, G. G., Rock Rapids, Ia.
Crawford, J. P., Davenport, Ia.
Criley, B. H., Dallas Center, Ia.
Crowell, H. C., Kansas City, Mo.
Cutts, R. E., Minneapolis, Minn.

Davis, B. B., Omaha, Neb.
Davis, F. C., Minneapolis, Minn.
Dorsey, F. B., Keokuk, Ia.
Downing, W. L., Moulton, Ia.
Dudley, E. C., Chicago, Ill.
Dunsmoor, F. A., Minneapolis, Minn.

Eisendrath, Dan'l N., Chicago, Ill.
Eitel, Geo. G., Minneapolis, Minn.
Erdman, C. A., Minneapolis, Minn.
Eyster, Geo. L., Rock Island, Ill.

Fairchild, D. S., Clinton, Ia.
Ferguson, A. H., 100 State St., Chicago, Ill.
Fordyce, O., Guthrie Center, Ia.
Forgrave, H. S., St. Joseph, Mo.
Fortner, B. F., Vinita, I. T.
Freeman, Leonard, Denver, Colo.

Gieger, Jacob, St. Joseph, Mo.
Grant, W. W., Denver, Colo.
Ground, Wm. E., West Superior, Wis.

Hageboeck, A. L., Davenport, Ia.
Hall, C. Lester, Kansas City, Mo.
Hall, W. A., Minneapolis, Minn.
Halley, Geo., Kansas City, Mo.
Halstead, A. E., Chicago, Ill.
Hamilton, H. P., Omaha, Neb.
Harris, M. L., 100 State St., Chicago, Ill.
Hawkins, Thos. H., Denver, Colo.
Henry, W. O., Omaha, Neb.
Hertzler, A. E., Halstead, Kan.
Hoegh, Knute, Minneapolis, Minn.
Hollowbush, J. R., Rock Island, Ill.
Hornibrook, Edw., Cherokee, Ia.

James, C. S., Centerville, Ia.
Jepson, Wm., Sioux City, Ia.
Jonas, A. F., Omaha, Neb.
Jones, W. D., Devils Lake, N. D.

Kellogg, J. H., Battle Creek, Mich.
Kimball, H. H., Minneapolis, Minn.
Knott, Van Buren, Sioux City, Ia.
Kreider, Geo. N., Springfield, Ill.

Livingston, T. P., Plattsmouth, Neb.

Loper, A. N., College View, Neb.
Lord, J. P., Omaha, Neb.

McArthur, L. L., Chicago, Ill.
McDonald, H. N., Minneapolis, Minn.
McLaren, A., St. Paul, Minn.
McKinnon, A. I., Havelock, Neb.
Macdonald, J. W., Minneapolis, Minn.
Macrae, Donald, Jr., Council Bluffs, Ia.
Mann, Arthur T., Minneapolis, Minn.
Martin, Franklin H., Chicago, Ill.
Maxwell, T. J., Keokuk, Ia.
Mayo, C. H., Rochester, Minn.
Moore, Jas. E., Minneapolis, Minn.
Munn, L. H., Topeka, Kan.
Murphy, J. B., Chicago, Ill.

Nelson, D. T., Chicago, Ill.
Newman, H. P., 100 State St., Chicago, Ill.
Niles, H. D., Salt Lake City, Utah.

Orr, H. W., Lincoln, Neb.
Oviatt, Charles W., Oshkosh, Wis.

Patterson, F. A., St. Joseph, Mo.
Pearse, H. E., Kansas City, Mo.
Poore, A. B., Cedar Rapids, Ia.
Porter, Miles F., Fort Wayne, Ind.
Pritchett, G. L., Fairbury, Neb.

Reed, R. Harvey, Rock Springs, Wyo.
Ricketts, B. Merrill, Cincinnati, O.
Robinson, S. E., West Union, Ia.
Rogers, John T., St. Paul, Minn.
Ross, W. L., Omaha, Neb.
Rudis-Jicinsky, J., Cedar Rapids, Ia.
Rustin, Frederick, Omaha, Neb.
Ruth, C. E., Keokuk, Ia.

Schmidt, Louis E., Chicago, Ill.
Schooler, Lewis, Des Moines, Ia.
Schroeder, W. E., Chicago, Ill.
Simmons, Geo. H., Chicago, Ill.
Skinner, G. R., Cedar Rapids, Ia.
Smouse, D. W., Des Moines, Ia.
Sones, C. O., Panora, Ia.
Sorkness, Paul, Fargo, N. D.
Stewart, C. A., Duluth, Minn.
Stewart, J. Clark, Minneapolis, Minn.
Stone, A. J., St. Paul, Minn.
Summers, J. E. Jr., Omaha, Neb.
Sweetser, H. B., Minneapolis, Minn.

Tichenor, Wm. A., Chicago, Ill.
Tompson, Benjamin, Tama, Ia.
Turck, Raymond C., Chicago, Ill.

Wallace, C. H., St. Joseph, Mo.
Warren, J. N., Sioux City, Ia.
Wear, I. N., Fargo, N. D.
Webster, J. Clarence, Chicago, Ill.
Wetherill, H. G., Denver, Colo.
Wheaton, C. A., St. Paul, Minn.
Williams, W. J., Adel, Ia.
Wright, A. L., Carroll, Ia.
Wright, Franklin R., Minneapolis, Minn.

Young, J. W., Bloomfield, Ia.